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U.S. Department of the Interior
Bureau of Land Management
Wyoming State Office

Rock Springs Field Office May 2002

DECISION RECORD
Finding of No Significant Impact and Environmental Assessment for The Quantum Adobe Town 2D Geophysical Project

2004-C14558/NF C

MISSION STATEMENT

It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

BLM/WY/PL-02/010+1310

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Rock Springs Field Office
280 Highway 191 North
Rock Springs, Wyoming 82901-3447

1792/1310 (040)
Quantum 2D
Geophysical Project

May 13, 2002

Dear Reader:

Attached you will find the Decision Record, Finding of No Significant Impact, and Environmental Assessment for Quantum's 2D Geophysical Project located on existing, pre-FLPMA (Federal Land Policy and Management Act) oil and gas leases within the Adobe Town Wilderness Study Area (WSA).

The environmental assessment was prepared after a 30-day public scoping period. All issues raised during scoping have been considered.

BLM appreciates the public's participation during preparation of the environmental analysis. The documents can be found on the Rock Springs Field Office's website. The address for Rock Springs' website is *http://www.wy.blm.gov/rsfo/rs_index.htm*. Copies are also available at the Rock Springs Field Office in Rock Springs. You may call Teri Deakins at 307-352-0211 to request copies. If you have questions about this action, please call John MacDonald at 307-352-0238.

Sincerely,

Field Manager

Attachment

DECISION RECORD
and
FINDING OF NO SIGNIFICANT IMPACT
for
THE QUANTUM ADOBE TOWN 2D GEOPHYSICAL PROJECT
Sweetwater County, Wyoming
EA# WY-040-EA02-067

Introduction

Quantum Geophysical Inc., (Quantum), on behalf of AEC Oil and Gas Inc. (lease holder), submitted a "Notice of Intent to Conduct Oil and Gas Geophysical Exploration Operations" to the Rock Springs Field Office on October 22, 2001 to conduct a 2D geophysical operation on existing federal oil and gas leases within the Adobe Town Wilderness Study Area (WSA) located in southeastern Sweetwater County, Wyoming (Figure 1). The total length of seismic line is 6.82 miles long but shot holes would be drilled only on those public lands contained within the existing leases (5.90 miles).

The following federal and state sections are affected by the proposal:

T. 14 N., R. 98 W.	Sections: 1
T. 15 N., R. 97 W.	Sections: 8, 9, 16 (State of Wyoming), 17, 19, 20, 30
T. 15 N., R. 98 W.	Sections: 36 (State of Wyoming)
T. 15 N., R. 97 W.	Sections: 4

All public lands managed by the Bureau of Land Management, with the exception of sections 1 and 4, are contained in federal oil and gas leases. The three leases pre-date passage of the Federal Land Policy and Management Act which required BLM to consider lands for wilderness designation. These leases are recognized as valid, existing rights under the *Interim Management Policy and Guidelines for Lands Under Wilderness Review* (IMP 1995, pg 13).

Lease Number	Date Issued	Acres
WYW-017284	January 17, 1969	1,840.00
WYW-017282A	March 1, 1969	640.00
WYW-017296	January 17, 1969	2,547.72

Alternatives Considered

The attached *Quantum Adobe Town 2D Geophysical Exploration Project* Environmental Assessment (WY-040-02-067, EA) fully analyzed two alternatives and considered two others. Under the Proposed Action, Quantum proposed to conduct 2D geophysical operations along a 6.82 mile line. Shot holes would be drilled on lease using air-powered heliportable drills, placed in areas of sparse or no vegetation, to drill 3.5-inch holes to an 80-foot depth and hand-lay cable, geophones, and other equipment needed for recording operations along the entire line. Each shot hole would be packed with a 30-pound charge of 60 percent seis-gel explosive and then backfilled with the drill cuttings. Any left over drill cuttings would be removed or scattered. As the holes are

2

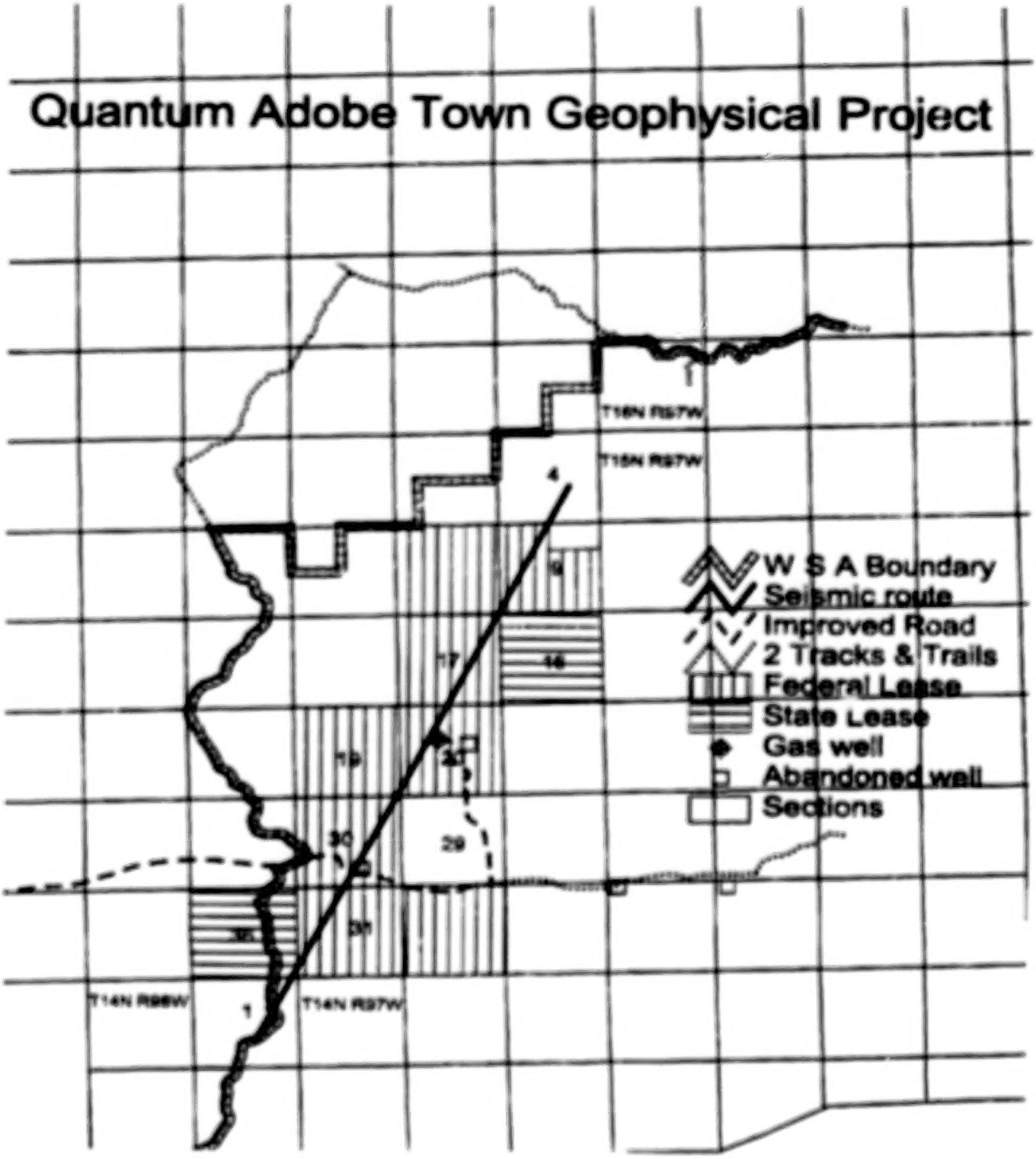

Figure 1. Area Map - Adobe Town 2D Seismic Project.

drilled and refilled, geophones lines (receivers) would be hand-laid on the ground to record the sound waves as the explosive charges are discharged. All personnel and equipment would be moved by foot, helicopter, or existing roads.

The No Action Alternative analyzed the consequences of denying Quantum's proposal. Two other alternatives brought forth during public scoping were considered but dropped from detailed analysis. One of these alternatives consisted of exchanging minerals and the other was application of a no surface occupancy stipulation to the existing lease should any drilling for hydrocarbons be proposed. The attached EA provides the rationale for not analyzing these two alternatives.

Decision

Based upon the analysis contained in the aforementioned EA, the BLM approves Quantum's proposed action. Quantum may proceed with geophysical operations on existing leases in the Adobe Town WSA once the Notice of Intent is approved. Geophysical operations will be subject to the following list of measures in addition to the standard measures contained in the approved Notice of Intent.

1. Vehicular traffic will be limited to BLM-approved existing routes. Vehicles will travel at slow speeds to limit disturbance to wildlife. All off-road project-related activities within the Adobe Town WSA would occur by foot travel or by helicopter.

2. Explosive charges will not be detonated within 500 feet of springs, flowing wells, or stock water wells.

3. No drilling would occur and no explosive charges would be detonated within 0.5 mile (1.0 mile for ferruginous hawks) of an active raptor nest during the mating/nesting season (February 1 through July 31) unless approved by BLM. Quantum has requested an exception to the seasonal restriction. Any exceptions approved will be in accordance with the procedures found in Appendix 7, Green River Resource Management Plan. Appendix A provides criteria for exception approval. A raptor survey was conducted April, 2002. No active raptor nests were found along the project line.

4. No drilling will occur and no explosive charges would be detonated within greater sage-grouse nesting habitat (suitable habitat within 2.0 mile of an active lek) during the breeding and nesting season of February 1 - July 31, or on important wintering areas as determined by BLM (Appendix A). No sage grouse leks are known to occur within 2 miles of the line.

5. Employees and contractors will not harass wildlife, leave trash in unauthorized locations, travel off-road in vehicles, and will not collect plants or cultural artifacts.

6. Seismic Line (2-D) activities, if conducted in suitable mountain plover habitat will be preceded by mountain plover surveys. These mountain plover field surveys will be conducted within mountain plover habitat along the project line and a 1/4 mile buffer on either side of the project corridor. U.S. Fish and Wildlife Service Mountain Plover Survey Guidelines (March 2002) recognizes that short-term, linear projects where actions move through an area within a day, result in no permanent habitat alteration, and no permanent project-related above ground features. Per the U.S. Fish and Wildlife Service mountain plover survey guidelines (March 2002), mountain plover surveys will be conducted 1 to 3 days before project activities begin. If an active nest is found, planned activity will be delayed

37 days or 7 days post-hatching. If a brood of flightless mountain plover chicks is observed, project activities will be delayed at least 7 days.

7. Investigations for BLM-sensitive species or their habitat would be conducted prior to any disturbance in areas determined by the BLM to contain potential habitat for such species (BLM Manual 6840). These areas would be avoided to the extent possible.

8. Any cultural resources discovered during operations will be reported immediately to BLM. Work will be halted in an area large enough to maintain integrity of the site and the site will be evaluated for significance. Evaluation may consist of, but not limited to, avoidance, testing, excavations, mapping, and/or further archival documentation. All evaluation efforts will be developed in cooperation or concurrence with the BLM and SHPO.

9. Quantum will be responsible for clean up of any diesel or hydraulic fluid spills, including contaminated soils. All spill-related material shall be hauled to a Wyoming Department of Environmental Quality (DEQ) approved disposal site.

10. As directed by the Authorized Officer, Quantum shall be responsible for redeeming areas disturbed by the geophysical operations on public lands managed by BLM. All trash, flagging, lath, etc. will be removed and disposed of in an authorized location.

11. Quantum will not conduct any vehicle operations during periods of saturated ground conditions when surface rutting would occur. Surface ruts deeper than 3 inches will be cause for the operations to cease.

12. Location of shot points have been located to avoid cultural sites 48SW14104, 48SW14105, and 48SW14106. Receiver points (cable and/or geophones) will be hand-laid over these sites. No artifacts will be removed.

13. Optimizing seismic operations at one time will reduce the amount of fugitive dust generated over the life of the project. No open burning of garbage or refuse is allowed in association with seismic activities.

14. Shot holes will be properly backfilled. They will also be inspected for subsidence within one field season and prior to release of the bond liability.

    Mitigation measures for paleontology will require: (a) avoidance of known localities, (b) worker education of the significance of fossil remains and the restriction on collection of paleontologic resources without a permit, and (c) provision for accidental discovery of fossil remains will reduce potential significant impacts.

    The proponent is responsible for informing all persons associated with this project that they shall be subject to prosecution for damaging, altering, excavating or removing any vertebrate fossil objects on site. If vertebrate fossil materials are discovered, the operator is to suspend all operations that further disturb such materials and immediately contact the Authorized Officer. Operations are not to resume until written authorization to proceed is issued by the Authorized Officer.

    Within five (5) working days, the Authorized Officer will evaluate the discovery and inform the operator of actions that will be necessary to prevent loss of significant paleontologic resources.

The operator is responsible for the cost of any mitigation required by the Authorized Officer. The Authorized Officer will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the Authorized Officer that the required mitigation has been completed, the operator will be allowed to resume operations.

15. Placement of portable drills on steep slopes (greater than 25%) will be avoided.

16. In order to minimize impacts to big game winter/yearlong range, patches of tall sagebrush will be avoided by seismic operations where practical.

17. BLM will be notified if personnel working for Quantum observe any unauthorized disturbance (i.e., 2-track trails) found in the Adobe Town Wilderness Study Area during seismic operations.

Rationale for the Decision

My decision to approve the proposed action is based upon the following:

- The Proposed Action is in conformance with the land use plan which allows for geophysical operations.

- The Proposed Action is consistent with management objectives and actions for the Monument Valley Management Area which specifies the area as open to mineral exploration provided mitigation can be applied to retain the resource values. The measures identified under the section entitled *Decision* assure that the resource values found in the management area remain protected.

- The Proposed Action, specifically use of helicopters to transport personnel and equipment into the Adobe Town WSA, use of portable drills to drill shot holes on existing leases, and the hand-laying of geophones to record seismic waves meet the non-impairment criteria for interim management of wilderness study areas (see *Interim Management Policy and Guidelines for Lands Under Wilderness Review*, 1995). In addition, the interim management policy recognizes valid existing rights. The leases involved pre-date the Federal Land Policy and Management Act which directed BLM to inventory certain lands for study for wilderness designation.

- Public participation, consultation, and coordination has occurred. BLM issued a scoping document on December 6, 2001, informing the public of the Proposed Action to conduct geophysical operations on pre-FLPMA leases within the Adobe Town WSA. Nine response letters were received during the scoping process. Eight of the nine comment letters supported the project and/or identified specific resource impact concerns that should be analyzed in the EA. The other letter was in opposition to the project and brought forth two alternatives and other issues they felt should be addressed. The issues brought forth in this letter have been considered to the extent that the resource value or issue is or may be applicable to the project or the project area.

- Since no listed or proposed for listing species are anticipated to be affected by this action, formal consultation with the U.S. Fish and Wildlife Service is not necessary. Mountain plover, a candidate species, is protected in that seismic activities will follow U.S. Fish and Wildlife guidelines for survey and protection of mountain plover. The action is not expected to jeopardize the existence of this species. Other sensitive plant and animal species should not be negatively impacted since the action is short-term in duration (7 days). Therefore, all species of concern (listed, proposed for listing, candidate, sensitive, and other species of concern) have been considered and/or protected.

Finding of No Significant Impact

Based upon the review of the EA, the BLM has determined that the Proposed Action with implementation of the mitigation measures identified above is in conformance with the Green River Resource Management Plan. Implementation of this decision will not have a significant impact on the human environment. Therefore, an EIS is not required.

Appeal

This decision is effective upon the date the decision or approval by the authorized officer. The decision or approval may be appealed to the appropriate office of the Interior Board of Land Appeals in accordance with regulations contained in 43 CFR 3150.2. If an appeal is filed, a copy of the notice of appeal must be filed in this office (Rock Springs Field Office, 280 Highway 191 North, Rock Springs, Wyoming 82901) within 30 days of receipt of the decision. Allowing 5 days mailing time, the appeal period ends 35 days from the date of this decision. The appellant has the burden of showing the decision or approval appealed from is in error.

If you wish to file a petition for stay pursuant to 43 CFR 3150.2(b), the petition for stay should accompany your notice of appeal and shall show sufficient justification based on the following standards:

1. The relative harm to the parties if the stay is granted or denied,
2. The likelihood of the appellant's success on the merits,
3. The likelihood of irreparable harm to the appellant or resources if the stay is not granted, and
4. Whether the public interest favors granting a stay.

Each adverse party to an appeal must be provided copies of all documentation. Adverse parties for this action include:

Quantum Geophysical Inc.
One Riverway, Suite 2100
Houston, TX 77056

AEC Oil and Gas
950 17th Street, Suite 2600
Denver, CO 80202

John McKee
Field Manager

May 13, 2002
Date

DECISION RECORD AND FINDING OF NO SIGNIFICANT IMPACT

Appendix A
Criteria to Consider for Exceptions to Seasonal Restrictions for Raptors/Sage Grouse

REQUESTER: ____________________ DATE OF REQUEST: ____________

PROJECT NAME: ____

REQUESTED DATE(S) OF EXCEPTION: ______________________________

ACTIVITY PROPOSED: ___________________________________

LAST DATE OF FIELD EXAM: ______________
GIS/ARCVIEW MAP REVIEWED: YES NO

General Considerations - Requests for Exceptions		**Comments**
Are factors leading to inclusion of the sage grouse/raptor seasonal restriction still valid?		
What action is the request for an exception for?		
Dates of the proposed exception?		
Criteria for Lek or Nesting Habitat/Location/Topography		**Comments**
Birds and type	present or absent	
Wintering Areas	yes, no	
Nest or lek location		
Topographical features		
Nest or Lek Active	yes, no, unknown	
Nest chronology of species		
Timing		**Comments**
Early or late in breeding/nesting season		
Kind of and length of disruptive activity		

RECOMMENDED ACTION: Based on the above analysis, I recommend the exception be:

Approved: ____________ Denied: ____________________

______________________________ Date: ____________________
Wildlife Biologist

The exception is: Approved: ____________ Denied: ____________________

______________________________ Date: ____________________
Authorized Officer

QUANTUM GEOPHYSICAL, INC.

ADOBE TOWN 2D GEOPHYSICAL

PROJECT ENVIRONMENTAL ASSESSMENT

(WY-040-EA02-067)

Prepared for

U.S. Department of the Interior
Bureau of Land Management
Rock Springs Field Office

May 2002

Prepared by

This Environmental Analysis was prepared by *Gary Holsan Environmental Planning*, an environmental consulting firm, with the guidance, participation, and independent evaluation of the Bureau of Land Management (BLM). The BLM, in accordance with Federal regulation 40 CFR 1506.5(a) and (b), is in agreement with the findings of the analysis and approves and takes responsibility for the scope and content of this document.

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CHAPTER 1

PURPOSE AND NEED

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION AND LOCATION

1.1.1 Description

Quantum Geophysical, Inc. (Quantum), a seismic acquisition company based in Houston, Texas has filed a Notice of Intent to conduct geophysical operations for the Adobe Town 2D seismic survey project located in southeastern Sweetwater County, Wyoming. This request is on behalf of the holder of certain federal oil and gas leases issued before enactment of the Federal Land Policy and Management Act of 1976 that are located in the Adobe Town Wilderness Study Area (WSA). These leases are recognized as valid, existing rights under the *Interim Management Policy and Guidelines for Lands Under Wilderness Review* (IMP, pg 13). The project area is generally located in Township 14 North, Range 98 West and Township 15 North, Ranges 97 and 98 West (Figure 1-1). A Notice of Intent has been submitted to the Rock Springs Field Office (RSFO) Bureau of Land Management (BLM).

The Adobe Town seismic project is to be a shothole, helicopter-assisted recording operation. Quantum has completed survey operations, paleontological review, and the Class III archeological inventory for the proposed seismic line. Seismic operations are proposed to commence following project approval.

The proposed Adobe Town 2D seismic project is one 6.82-mile long seismic line (Figure 1-1). The project is located on public lands (federal ownership) administered by the BLM, RSFO and a short segment of the line affects the surface estate owned by the State of Wyoming. The proposed line is located entirely within the Adobe Town WSA.

1.2 PURPOSE OF AND NEED FOR ACTION

The overall purpose and need for this project is to employ practical methodologies for detecting oil and gas in stratigraphic and structurally complex subsurface strata. The proposed project would provide critical detailed subsurface data that would be used to detect subsurface structures capable of bearing hydrocarbons.

Geophysical exploration utilizing 2D seismic techniques is an intensive data acquisition and computer processing technique used to analyze and two dimensionally (2D) depict subsurface geologic structures and stratigraphy. The technique is capable of locating and displaying unknown subsurface reservoir rock which potentially contains producible hydrocarbons. Data obtained through 2D seismic survey would enable wells to be drilled with a greater probability of locating producible hydrocarbons than is normally attainable by utilizing previous methods such as less precise exploratory drilling. This would result in fewer non-productive wells being drilled in an area, and therefore, overall less surface disturbance resulting from access road and drill site construction.

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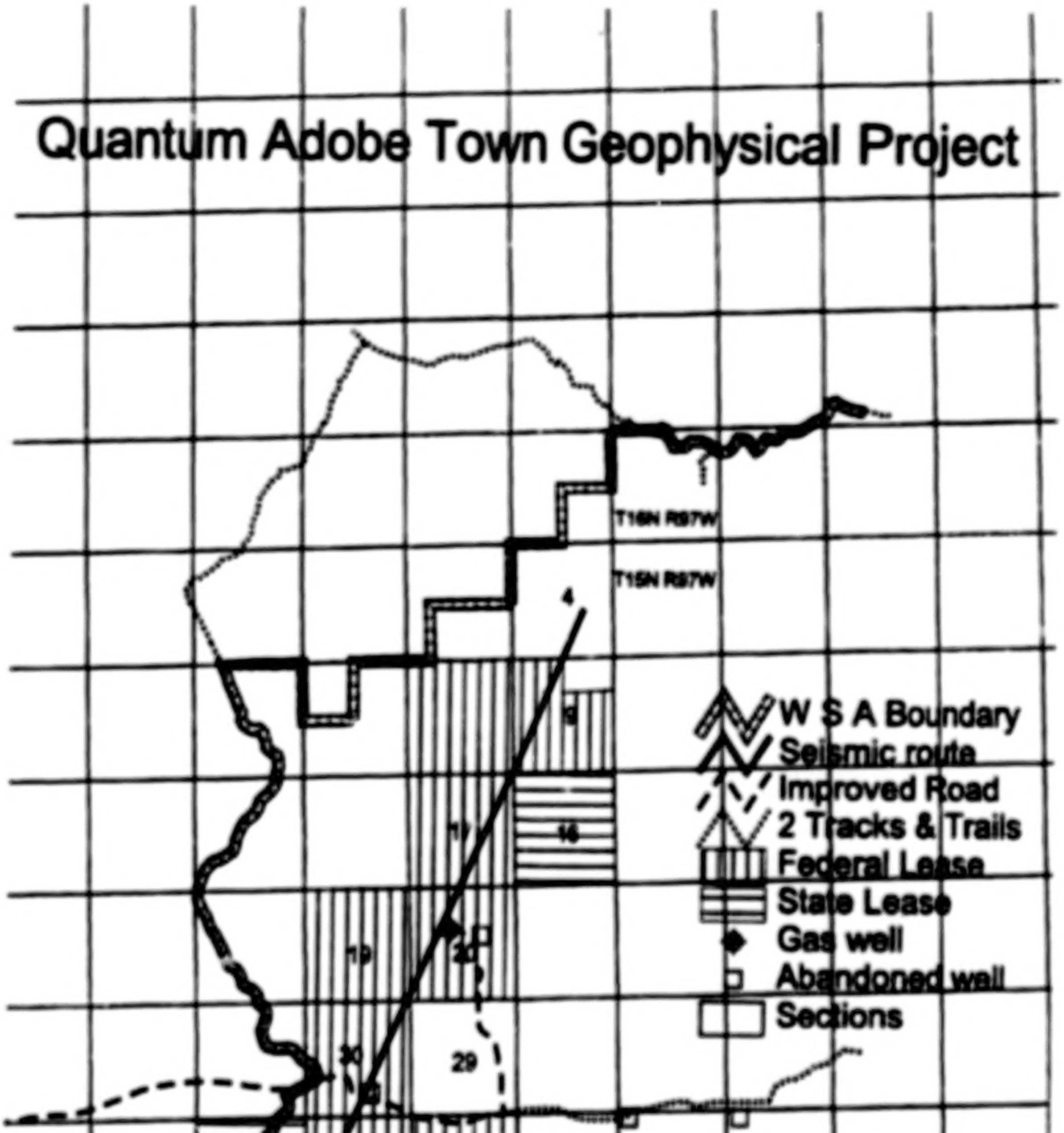

Figure 1-1. Area Map - Adobe Town 2D Seismic Project.

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1.3 PURPOSE OF THE ENVIRONMENTAL ANALYSIS PROCESS

The BLM, Rock Springs Field Office (RSFO), Rock Springs, Wyoming, is the lead agency responsible for preparation of this EA. The evaluation of this proposal and alternatives were developed through interdisciplinary review with representatives from Quantum, the lessee, and the BLM, RSFO. Also, for purposes of this EA, reference to Quantum, as the project proponent, includes all contractors, subcontractors or other parties that would be involved in the design, layout, and operation of the proposed Adobe Town 2D seismic program.

The BLM, as mandated by the Council for Environmental Quality (CEQ) and National Environmental Policy Act (NEPA) directives, analyzes actions involving federal lands to determine their impact on the human environment (40 CFR, Parts 1500-1508). Prior to issuing a decision on the Quantum proposal, the BLM must comply with the requirements of NEPA. NEPA requires Federal agencies to use a systematic, interdisciplinary approach to ensure the integrated use of natural and social sciences in planning and decision making. NEPA also directs that an environmental analysis of proposed Federal actions must be completed to determine the probable effects of the federal action on the environment. The analysis is to determine whether approval of the proposed action would cause significant impacts to the human environment. The evaluation of the proposed action and alternatives was conducted by an interdisciplinary team with representatives from the BLM and a third-party contractor approved by and working under the direction of the BLM.

Factors considered during the environmental analysis process regarding the Adobe Town 2D seismic project include the following:

- A determination of whether the proposal and alternatives are in conformance with BLM policies, regulations, and approved resource management plan direction.
- A determination of whether the proposal and alternatives are in conformance with policies and regulations of other agencies likely associated with the project.

This EA is not a decision document. It documents the process used to analyze the potential impacts of the proposed action and alternatives and discloses the effects of the proposed action and alternatives to that action. A Decision Record, signed by the responsible official (Field Manager, BLM, RSFO) will document the final decision regarding the selected alternative. The BLM will document whether or not significant impacts would occur with implementation of any of the alternatives. If the BLM determines that no significant impacts would occur, a Finding of No Significant Impact (FONSI) Decision Record would be issued. If significant impacts are identified, the BLM decision would issue a Notice of Intent to prepare an environmental impact statement, with subsequent public input and additional analysis of the alternatives. The BLM decision will relate to BLM administered lands.

BLM's authority for imposing mitigation measures, including terms and conditions for approval of the NOI, pertains only to the federal lands, except on issues relating to 1) sites listed, eligible, or potentially eligible for the National Register of Historic Places and 2) Threatened and Endangered Species.

1.4 RELATIONSHIP TO POLICIES, PLANS, AND PROGRAMS

1.4.1 Conformance With Land Use Plan

The document which directs management of federal lands within the RSFO is the approved Green River Resource Management Plan (RMP -USDI-BLM 1997). The project area affects public lands in the Adobe Town WSA. Management objectives for the WSA are to retain the wilderness quality and manage the WSA in accordance with the IMP until Congress acts on designation. All non-exempt actions within the WSA must comply with the non-impairment standard provided in Chapters I and II of BLM Handbook H-8550-1, the *Interim Management Policy and Guidelines for Lands Under Wilderness Review* (1995).

The Handbook provides six different practical effects of provisions in Federal Land Policy and Management Act (FLPMA) with respect to "interim management" of lands under wilderness review (IMP, pg 3):

1. The general standard for interim management is that lands under wilderness review must be managed so as to not impair their suitability for preservation as wilderness (nonimpairment standard). This applies to all uses and activities except those specifically exempted from this standard by FLPMA (such as grandfathered uses).

2. Permitted activities in WSAs (except grandfathered and valid existing rights) are temporary uses that create no new surface disturbance, nor involve permanent placement of structures.

3. Those grazing, mining, and mineral leasing uses that existed on October 31, 1976 (the date FLPMA was approved) may continue in the same manner and degree as on that date, even if this would impair wilderness suitability.

4. Lands under wilderness review may not be closed to appropriation under the mining laws in order to preserve their wilderness character.

5. Valid existing rights must be recognized.

6. All lands must be managed to prevent unnecessary or undue degradation.

Management direction in the IMP provides that seismic and inventory information gathering by helicopter or other means not requiring road blading or improvement may be allowed if it satisfies the nonimpairment criteria described in Chapters I and II of the Handbook (IMP, pg 33).

The Handbook also provides that activities proposed under leases, permits, and mining claims will be subject to the nonimpairment criteria described in Chapters I and II of the Handbook, except to the extent a specific proposal is covered by the 'grandfather' or 'validated existing rights (VERs) provisions. Leases associated with the proposed Adobe Town 2D seismic project were issued prior to October 31, 1976. Policy provides that all pre-FLPMA leases represent VERs, but the rights are dependent upon the specific terms and conditions of each lease, including any stipulations attached to the lease. Activities for the use and development of such leases must satisfy the nonimpairment criteria unless this would unreasonably interfere with rights of the lessee as set forth in the mineral lease. When it is determined that the rights conveyed can be exercised only through activities that will impair wilderness suitability, the activities will be regulated to prevent unnececessary or undue degradation. Nevertheless, even if such activities impair the area's wilderness suitability, they will be allowed to proceed. A pre-FLPMA lease does not carry with it a VER to obtain access to the lease boundaries across Federal lands and, in the absence of "grandfathered" uses, access may not be granted if it would violate the nonimpairment standard (IMP, pg 32).

It must be recognized that Quantum is working on behalf of the oil and gas lessee who holds three pre-FLPMA leases. The three leases pre-date passage of NEPA and FLPMA (which required BLM to consider lands for wilderness designation).

Lease Number	Date Issued	Acres
WYW-017284	January 17, 1969	1,840.00
WYW-017282A	March 1, 1969	640.00
WYW-017296	January 17, 1969	2,547.72

The seismic line also affects public lands in an area known as Monument Valley Management Area (MVMA). The boundary of the MVMA extends into the Adobe Town WSA. Designation of the MVMA as an Area of Critical Environmental Concern (ACEC) was deferred in the Green River RMP until a determination is made whether specific resources meet the ACEC relevance and importance criteria. Until an evaluation is made, management objectives for the area provide protection of wildlife, geologic, cultural, watershed, and scientific values. The area is open for consideration for mineral leasing, exploration, and development provided mitigation can be applied to retain the resource values (Green River RMP, p 37). Management prescriptions identified for the MVMA (i.e., paleontological study) have been incorporated but because the management requirements are more restrictive under the IMP, the MVMA is not discussed as a separate section.

The proposed geophysical project is in conformance with management objectives and actions provided in the approved Green River RMP and the IMP. Conformance is subject to implementation of prescribed mitigation measures proposed by Quantum in Chapter 2 and the mitigation measures derived through analysis of impacts in Chapter 3, Affected Environment/Environmental Consequences of this document.

1.5 ISSUES AND CONCERNS

1.5.1 Public Notification

BLM Handbook H-8550-1 (IMP) requires BLM to notify interested parties of certain actions proposed in WSAs including proposals to conduct geophysical operations (IMP, pg 20). In compliance with the handbook, BLM issued a scoping document on December 6, 2001, informing the public of the Proposed Action to conduct geophysical operations in the Adobe Town WSA. Nine response letters were received during the scoping process. These response letters are summarized in Chapter 4, Consultation and Coordination, of this EA.

1.5.2 Issues and Concerns

Environmental and social issues of local importance associated with the seismic project identified during the scoping process are as follows:

- Potential impacts to the wilderness character of lands within the Adobe Town WSA.

- Potential impacts to wildlife habitats within the project area and adjacent lands, including sage grouse, raptors, prairie dogs, and other sensitive plant and animal species.

- Potential impacts to paleontological values within the analysis area.

- Potential impacts to cultural and historical values within the project area.
- Reclamation of disturbed areas associated with shot-hole drilling.

- Potential impacts to special status species, threatened, endangered, candidate or proposed species.

- Potential impacts to big game and their habitat (including crucial winter range) and wild horse habitat.

- Potential impacts of shot hole seismic activity on the subsurface hydrology.

- Potential impacts to sensitive soils within the project area.

- Potential impacts to vegetation along the proposed seismic line.

- Potential impacts to socioeconomics.

CHAPTER 2

PROPOSED ACTION AND PROJECT ALTERNATIVES

2.1 PROPOSED ACTION

Quantum is proposing to acquire 6.82 total miles of 2D seismic data for AEC Oil & Gas USA, Inc. (AEC) within the Adobe Town WSA. AEC has existing oil and gas leases inside the WSA covering tracts the proposed seismic line would cross. The sections affected by the seismic line include:

T.14 N., R.98 W.	Sections: 1
T.15 N., R.97 W.	Sections: 8, 9, 16 (State of Wyoming), 17, 19, 20, 30
T.15 N., R.98 W.	Sections: 36 (State of Wyoming)
T.15 N., R.97 W.	Sections: 4

Specific components of the Proposed Action are as follows:

Quantum proposes to utilize 2 survey crews accessing the seismic line by foot travel, helicopter, or existing roads. No new roads or improvement to existing roads are proposed. A pin flag would be placed every 110 feet to indicate receiver points with a lath placed every 440 feet to indicate a shot point location. Shot points would be located every 440 feet on AEC's leases within the WSA although some modification of shot points may occur to avoid cultural or paleontological sites. No shot points are proposed off lease. Where the receiver line is proposed off AEC leases (approximately 4,800 feet total, about 3,000 feet on the north end of the line and 1,800 feet on the south end of the line), the receiver line (geophones, cable) would be hand-placed and receiver points located every 110 feet. There would be approximately 5.90 miles of shot point locations, located on lease only, with approximately 70 shotholes and 6.82 miles of receiver line. Seismic operations are expected to take 7 days. The project would commence upon approval by BLM, which is anticipated to be May, 2002.

Quantum proposes to set up staging areas on existing disturbed areas located on private lands (Eversole Ranch) for the deployment of equipment and a helicopter landing area. The staging area would consist of two highboy equipment trailers and a parking area for crew transport vehicles. They also plan on using private property or existing roads for the recording truck or "doghouse" locations where possible. If it is necessary to set up a staging area on public lands administered by BLM, Quantum would conduct appropriate surveys (i.e., cultural, special status plant and animal species, etc.) prior to approval for use of these areas.

Drilling operations would be conducted utilizing heliportable drills powered by air. Drill units would be flown to each location, and placed on sites devoid of or having sparse vegetation in order to minimize crushing or breakage of plants. Drill operators and helpers would be transported by helicopter to and from each location. At each location a 3.5-inch diameter hole would be drilled to a depth of 80 feet and loaded with a 30-pound charge of 60 percent seis-gel explosive. Each hole would immediately be plugged with the drill cuttings in accordance with Wyoming Oil and Gas Commission Rule 406 and BLM requirements. Any drill cuttings left over would be either removed or scattered. The area affected at each shot point would be about 8 feet by 8 feet. There would be 70 shot points along the line affecting approximately 0.10 acre. Due to the limited disturbance (no clearing of vegetation, portable drills on skids, small drill holes) no reclamation is proposed.

Recording operations would be conducted by deploying equipment with a helicopter to a location every 660 feet on line. The cable, geophones, MRX data processing boxes and battery packs would then be hand carried and placed on the line by crews operating on foot. Personnel would be transported to the line by helicopter from a staging area located outside the WSA or enter by foot travel. The recording truck would be located on the existing road that is the western boundary of the WSA. Detonation of the explosive charges would occur during recording operations. The resulting sound waves would be recorded.

Once the recording line is no longer required, crews of four individuals would load the equipment and trash into the bags. "Bag runners" hook the bags to the helicopter long line and the equipment is removed along with all trash, survey flagging, and lath. On the source lines the shooters would remove any trash once they have completed detonating each hole. The garbage detail is kept current with seismic crew progress.

The recording crew consists of the following vehicles:

1 - F800 recording truck
1 - 15 passenger crew van
2 - 3/4 ton pickup trucks
2 - ½ ton pickup trucks
3 - 1 ton stake trucks to transport recording equipment
1 - 1 ton mechanic truck
1 - truck trailer (transport portable drill rig equipment)
1 - small support trailer (misc. equipment)
1 - Llama helicopter
1 - support truck for the helicopter

Project clean-up would concurrently proceed with the completion of recording operations with all pinflags, lath, and trash collected as the program progresses.

2.1.1 Applicant-Committed Measures

- Vehicular traffic would be limited to BLM-approved existing routes. Vehicles would travel at slow speeds to limit disturbance to wildlife. All off-road project-related activities within the Adobe Town WSA would occur by foot travel or by helicopter.

- Explosive charges would not be detonated within 500 feet of springs, flowing wells, or stock water wells.

- Portable drills would not be placed on slopes in excess of 25%.

- No drilling would occur and no explosive charges would be detonated within 0.5 mile (1.0 mile for ferruginous hawks) of an active raptor nest during the mating/nesting season (February 1 through July 31) unless approved by BLM. Quantum has requested an exception to the seasonal restriction. Any exceptions approved would be in accordance with the procedures found in Appendix 7, Green River RMP. A survey of known raptor nests in the vicinity of the seismic line occurred in late April. Appendix A provides criteria for exception approval.

- No drilling would occur and no explosive charges would be detonated within greater sage-

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grouse nesting habitat (suitable habitat within 2.0 mile of an active lek) during the breeding and nesting season of February 1 - July 31, or on important wintering areas as determined by BLM. No sage grouse leks are known to occur within 2 miles of the line and a survey of wintering areas is not necessary due to timing of the operations.

- Employees and contractors would not harass wildlife, leave trash in unauthorized locations, travel off-road in vehicles, and would not collect plants or cultural artifacts.

- Seismic Line (2-D) activities, if conducted in suitable mountain plover habitat would be preceded by mountain plover surveys. These mountain plover field surveys would be conducted within mountain plover habitat along the project line and a 1/4 mile buffer on either side of the project corridor. U.S. Fish and Wildlife Service Mountain Plover Survey Guidelines (March 2002) recognizes that short-term, linear projects where actions move through an area within a day, result in no permanent habitat alteration, and no permanent project-related above ground features. Per the U.S. Fish and Wildlife Service mountain plover survey guidelines (March 2002), mountain plover surveys would be conducted 1 to 3 days before project activities begin. If an active nest is found, planned activity would be delayed 37 days or 7 days post-hatching. If a brood of flightless mountain plover chicks is observed, project activities would be delayed at least 7 days.

- Investigations for BLM-sensitive species or their habitat would be conducted prior to any disturbance in areas determined by the BLM to contain potential habitat for such species (BLM Manual 6840). These areas would be avoided to the extent possible.

- Any cultural resources discovered during operations would be reported immediately to BLM. Work would be halted in an area large enough to maintain integrity of the site and the site would be evaluated for significance. Evaluation may consist of, but not limited to, avoidance, testing, excavations, mapping, and/or further archival documentation. All evaluation efforts would be developed in cooperation or concurrence with the BLM and SHPO.

- Quantum would be responsible for clean up of any diesel or hydraulic fluid spills, including contaminated soils. All spill-related material shall be hauled to a Wyoming Department of Environmental Quality (DEQ) approved disposal site.

- As directed by the Authorized Officer, Quantum shall be responsible for reclaiming areas disturbed (staging areas) by the geophysical operations on public lands managed by BLM. All trash, flagging, lath, etc. would be removed and disposed of in an authorized location.

- Quantum would not conduct any vehicle operations during periods of saturated ground conditions when surface rutting would occur. Surface ruts deeper than 3 inches would be cause for the operations to cease.

- Location of shot points have been located to avoid cultural sites 48SW14104, 48SW14105, and 48SW14106. Receiver points (cable and/or geophones) would be hand-laid across these sites to prevent damage. No artifacts would be removed.

2.2 ALTERNATIVE A - NO ACTION

The National Environmental Policy Act (NEPA) requires that reasonable alternatives to the Proposed Action be analyzed (Section 40 CFR 1508.9(b)). Under the No Action Alternative, BLM would deny the Adobe Town 2D seismic project as proposed by Quantum on leases held by AEC. Quantum, and consequently their client, AEC, would be denied the opportunity to acquire seismic information which would help them make a determination of whether potential for hydrocarbon bearing formations exist on the federal leases held by AEC.

2.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

2.3.1 Alternatives Considered but Dropped From Further Analysis

In accordance with 40 CFR 1502.14(a), BLM is required to rigorously explore and evaluate all reasonable alternatives and for alternatives which are eliminated from detailed study, briefly document why such alternatives were dropped from detailed analysis.

Exchange of minerals: One comment letter suggested that BLM consider exchanging minerals within the pre-FLPMA leasehold. This alterative is not analyzed for the following reasons. The heliportable drill will be located to the extent possible in areas of sparse or devoid of vegetation to minimize crushing or breakage of individual branches of plants; thus, no reclamation of vegetation is requested or required. No roads or improvement to roads are proposed. Heliportable drills will be used to drill 3.5-inch holes, every 440 feet along the 2-D seismic line within the leaseholds. Drill cuttings will be replaced into the holes once the charges are packed and cuttings will be removed or raked into the surrounding soil if any remain on the surface.

Geophysical work, because of the way it is conducted, does not cause impairment of the area's suitability for preservation as wilderness (IMP, pg 3). It basically is information gathering. It does not always cause the drilling of a producing oil and gas well. This information could lead to an Application for Permit to Drill a oil or gas well but it also could provide information showing no potential reservoir characteristics exist on these lands. Due to these factors, BLM finds any potential impacts to be minimal and meet the non-impairment criteria found in Handbook 8550-1 (IMP, pg 9) and in recognition of the valid existing rights as they pertain to the pre-FLPMA leases (IMP, pg 32). This alternative will not be given further consideration.

Application of a NSO stipulation to subsequent actions: The same comment letter also suggested application of a NSO (no surface occupancy) stipulation. This alternative is also not further considered because geophysical activity is an information gathering stage not a well drilling stage. NSOs are a stipulation applied to a parcel before it is leased. Geophysical activity may or may not occur on a lease. Again, geophysical activity does not always lead to the utilization of a lease through the drilling of a well. There is no reason to consider NSOs for geophysical activity on these leases. Geophysical activity will have little or no effect on the wilderness characteristics in this WSA. It is low-impact activity especially in the way this document describes how it will occur. Should the oil and gas lessee propose to drill well/s on their lease holds, that action will be analyzed in accordance with NEPA and IMP policy. This alternative will not be given further consideration.

CHAPTER 3

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.0 INTRODUCTION

The chapter of this environmental assessment (EA) for the proposed Adobe Town 2D seismic project discusses environmental, social, and economic factors as they currently exist within the Adobe Town project area (ATPA). The material presented here has been guided by management issues identified by the Bureau of Land Management (BLM), Rock Springs Field Office.

This proposal could potentially affect critical elements of the human environment as listed in BLM's National Environmental Policy Act (NEPA) Handbook H-1790-1 (USDI-BLM 1988). The critical elements of the human environment, their status in the ATPA and their potential to be affected by the proposed project are listed in Table 3-1.

Table 3-1. Critical Elements of the Human Environment[1], Adobe Town 2D Geophysical Project, Sweetwater County, Wyoming, 2002.

Element	Status on the ATPA	Addressed in text of EA
Air quality	Potentially affected	Yes
Areas of critical environmental concern	None present	No
Cultural resources	Potentially affected	Yes
Environmental justice	None present	No
Prime or unique farmlands	None present	No
Floodplains	None present	No
Native American religious concerns	None present	No
Invasive plants	Potentially affected	Yes
Threatened and endangered species	Potentially affected	Yes
Hazardous or solid wastes	None present	No
Water quality (surface and ground water)	Potentially affected	Yes
Wetlands/riparian zones	None present	No
Wild and scenic rivers	None present	No
Wilderness (study area)	Potentially affected	Yes

[1] As listed in BLM *National Environmental Policy Act Handbook H-1790-1* (BLM 1988b) and subsequent Executive Orders

In addition to the critical elements, this EA discusses potential effects of the project on geology/paleontology/soils, Adobe Town wild horse herd management area, vegetation, wildlife/special status species, noise, wilderness/visual resources/recreation, and socioeconomic considerations.

This discussion also provides an analysis of impacts and the potential environmental consequences that would result with project implementation. In addition, mitigation measures are provided that were developed in response to impacts described in the discussion of environmental consequences. The measures and requirements describe how seismic exploration operations would be managed to reduce or eliminate impacts to other resource values in the project area.

The No Action Alternative, with implementation, would result in the proposed geophysical project not occurring. Existing land and resource use activities within the project area would continue as is without the effects associated with the Adobe Town 2D seismic project. As a result, there would be no change to the existing environment unless otherwise noted.

The information presented here has been guided by interdisciplinary analysis of the proposed Adobe Town 2D seismic program.

3.1 AIR QUALITY

3.1.1 Affected Environment/No Action Alternative

The project area and general vicinity is in attainment for all the National Ambient Air Quality Standards (NAAQS) and Wyoming Ambient Air Quality Standards (WAAQS). Table 3-2 shows the measured background pollutant concentrations in the region as compared to the NAAQS and WAAQS.

Table 3-2. Measured Background Concentrations in Southwest Wyoming Compared to the National and Wyoming Ambient Air Quality Standards.

Pollutant	Averaging Period	WAAQS ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Measured Background Concentration ($\mu g/m^3$)
NO_2	Annual	100	100	9
SO_2	3-hour	1,300	1,300	132
	24-hour	260	365	43
	Annual	60	80	9
PM_{10}	24-hour	150	150	18
	Annual	50	50	8
$PM_{2.5}$	24-hour	N/A	65	10
	Annual	N/A	15	5
CO	1-hour	40,000	40,000	3,500
	8-hour	10,000	10,000	1,500
Ozone	8-hour	160	160	130

The air quality in the project area is predominantly good, with low ambient concentrations of pollutants. Air pollutants occurring in the area are mainly dust resulting from travel on unsurfaced roads.

The ATPA is classified as a Prevention of Significant Deterioration (PSD) Class II area, which includes areas that may be industrialized with release of certain pollutants within the requirements of State of Wyoming Division of Air Quality's ambient and PSD standards. Annual geometric mean values in the area generally fall well within the Wyoming annual standard of 60 micrograms per cubic meter (Table 3-2). The levels for total suspended particulates are largely due to livestock grazing and wind-blown dust from travel on rural roads and agricultural activities. Concentrations of gaseous pollutants are very low, falling well within the State and Federal standards.

3.1.2 Environmental Consequences

Air quality could be impacted as a result of project operation in the following ways: 1) suspended particulate matter generated from seismic operations (drilling operations) and vehicle travel on unimproved dirt roads, and 2) emissions from seismic equipment, including support vehicles.

The proposed project would have a negligible short-term effect on the quality of the air in the project area and down-wind from the project area. Fugitive dust would be generated by the support vehicles traveling on existing improved and unimproved dirt roads. Fugitive dust would only be generated during times of dry soil. The small number of drilling units and support vehicles used in the seismic project would emit nominal quantities of byproducts of fossil fuel combustion, including NO_x and SO_2. The short duration of geophysical operations combined with good atmospheric circulation would minimize the impacts on air quality. Such impacts are temporary and would not be considered important. No cumulative impacts would occur to air quality with implementation of the proposed seismic program.

3.1.3 Mitigation Summary

Optimizing seismic operations at one time would reduce the amount of fugitive dust generated over the life of the project. No open burning of garbage or refuse should be allowed in association with seismic activities.

3.2 GEOLOGY/FLUID MINERALS /PALEONTOLOGY/SOILS

3.2.1 Affected Environment

Geology/Fluid Minerals

The proposed seismic line lies within the Washakie Basin, the easternmost subbasin of the Greater Green River Basin. The Washakie Basin is a structural basin bounded by mountain or arch uplifts. It is bounded to the east by the Sierra Madre, to the north by the Wamsutter Arch, to the west by the Rock Springs Uplift, and to the south by the Cherokee Ridge. The Washakie Basin began developing as a structural basin about 70 million years ago during the late Cretaceous Period. Its axis trends northeast-southwest and Cretaceous rocks dip inward at approximately 8 degrees along its eastern flank and about 15 degrees along its western flank (Love 1970). During the late Cretaceous and early Tertiary the basin filled with sediments eroded from surrounding highlands and mountains. Cretaceous and Tertiary sedimentary rocks comprise a great thickness in the basin. Depth to Late Cretaceous rocks in the basin central exceeds 16,000 feet and Precambrian basement rocks lie at depths greater than 32,000 feet. Surface elevations in the basin range from about 6,100 to 8,700 feet and average about 7,000 feet.

Sedimentary deposits of early Tertiary (middle Eocene) age crop out along the proposed seismic line. These deposits, including the Adobe Town Member of the Washakie Formation, consist chiefly of rocks that accumulated in terrestrial environments.

Below the surface of the seismic line is underlain by Phanerozoic sedimentary rocks, with the exception of no Silurian and Ordovician age deposits. These deposits range in age from Quaternary to Cambrian.

Petroleum was first discovered in the Washakie Basin in 1948 in the Wamsutter Field where production was encountered in the Almond Formation (Upper Cretaceous). The 1970s saw the discovery of oil and gas in the Washakie Basin in Cretaceous rocks in several fields (Haystack, McPherson Springs, Triton and Windmill Draw). Additional discoveries were made in the 1980s in the Cedar Breaks, Desert Rose, N.T., Dripping Rock, Rim Unit, and Shallow Creek fields.

Oil and gas production in these fields is derived from upper Cretaceous rocks ranging in depth from slightly more than 9,000 feet to more than 16,000 feet. Producing formations include with increasing age and depth the (1) Lance Formation, (2) Fox Hills Sandstone, (3) Lewis Shale, and (4) Mesaverde Group, including chiefly the Almond Sandstone. The best producers thus far have been lenticular sandstones in the Lewis and Mesaverde Group (including the Almond Sandstone).

Considerable gas reserves may be contained in the deeper parts of the Washakie Basin in tight sands of Cretaceous and early Tertiary age generated from coals and carbonaceous shales in the Fort Union, Lance, and Mesaverde Group and perhaps the Lewis and Cody Shales. At depths greater than 8,000 feet along the basin margin and 10,000 feet in the basin center these rocks are over pressured (McPeek 1981; Surdam, et al.; 1995) with bottom hole pressure gradients in the 0.83 and 0.86 psi/ft for the Mesaverde at Haystack and Adobe Town, and 0.55 to 0.6 psi/ft range in the younger Lance and Fort Union gas pay zones. According to McPeek (1981) there is considerable additional potential for oil and gas reserves in these units deeper in the Washakie Basin because of the abnormally high pressure gradients.

Deeper parts of the eastern Green River Basin (including the Washakie Basin) remain sparsely explored, but sandstones in the Lewis and Almond Formations, as well as younger ones in the overlying Lance and Fort Union Formations, might prove to contain large reserves (>20Tcf) of natural gas. Thermal and maturation modeling (Surdam, et al., 1995) show that Almond Formation shale and coal in the central parts of the basin had generated significant amounts of liquid hydrocarbons by 40 million years ago and that gas generation from oil to gas reaction had progressed significantly by 30 million years ago.

Three oil and gas leases are affected by the action. WYW-017284 was issued January 17, 1969 and covers 1,840 acres. Lease WYW-017282A was issued March 1, 1969 and covers 640 acres. Lease WYW-017296 was issued January 17, 1969 and encompasses 2,547+ acres. All three leases pre-date passage of NEPA and FLPMA which required BLM to consider lands for wilderness designation. Regardless, leases existing on October 21, 1976 are considered as valid existing rights under the IMP. Two other wells, one located in Section 20, T. 15 N., R. 97 W. and one located in Section 30, T. 15 N., R. 97 W., are within the three pre-FLPMA leases affected by the seismic project but have been plugged and abandoned.

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Paleontological Resources

Deposits of the Adobe Town Member of the Washakie Formation (middle Eocene) crop out along the proposed seismic line. This unit is known to yield vertebrate fossils of high scientific interest and for that reason it satisfies BLM Paleontologic Resource Condition 1 (H8270- 1 General Guidance for Paleontological Resource Management). Condition 1 lands trigger formal analysis of existing data prior to authorizing land-use actions involving surface disturbance. Literature and records review (EVG 2002) documented nine Field Museum (Chicago) localities within a mile of the proposed seismic line.

Management actions for protecting paleontological sites include surface and subsurface stipulations and discretionary management authority. According to the Green River RMP, Monument Valley Management Area lands will be evaluated for paleontology if surface disturbing activities are involved. Based on the palenotology report (EVG 2002), BLM recommends worker education and contingency for discovery of scientifically significant fossils during work. The scientific significance of the locality intercepted by the seismic line is such that the scale of the proposed project would have little effect and no specific mitigation for operating within the locality is recommended (EVG, personal communication, 2/11/02).

Soils

Specific management actions for soil resources in the Green River RMP are designed to reduce soil erosion and sedimentation and salinity contributions to area waters. Management actions include minimizing surface disturbance in areas with highly saline soils. The Green River RMP requires the use of best management practices relative to the Clean Water Act of 1972 to control non-point sources of water pollution. The Green River RMP requires soil management practices to be applied to proposed projects. These practices are related to the steepness of slopes, the length of slopes, and soil chemistry and composition.

Soils in the project area are closely related to the parent bedrock and overall geomorphology. Middle Eocene and Quaternary make up the geologic units in the area and have a distinct impact on the subsequent development of the soils and their distribution. The dominant middle Eocene formation is the Washakie Formation and its associated Adobe Town Member. Textures in this Member are various and range from sandstone, siltstone, mudstone, silty limestone, silty dolomite, tuff and conglomerate.

Soils in the project area formed under a dry, cool climate with spring moisture. They have low organic matter and are formed from residuum on Tertiary bedrock-controlled uplands and in Quaternary alluvium and colluvium along stream and river courses. Residual soils formed from the many types of bedrock exposed at the surface, as well as from wind and flowing water deposits. Principle parent materials of soils in the project area are shales, siltstones, sandstones, and alluvium.

Heavier soils (e.g., silty clay or clay textures) occur in bottom lands and badland breaks and slopes. Stratified sands and gravels are present in river wash associated with streambeds and associated alluvial terraces. Badlands and rock outcrops are formed from mudstone, siltstone, and sandstone of the Adobe Town Member of the Washakie Formation and have little or no soil development due to their predominant erosive feature.

There are two limiting soil factors within the project area: 1) soils on steep slopes and 2) soils with a severe erosion potential.

There is about 130 meters (400 feet) of vertical relief along the proposed seismic line. Elevation generally increases in a southwesterly direction from the western tributaries of Sand Creek to the unnamed butte in Sec 1 and 12, T14N, R98W. Minimum elevation is about 6,760 feet in the northeast to about 7,160 feet in the southwest. Slopes within the project area are generally level to undulating (0 to 10 percent) and broken by areas of steeper slopes (10 to 40 percent).

Gentler slopes dominate the northeastern part of the area including the western tributaries of Sand Creek and its associated alluvial terraces. Moderate sloping terraces and rolling, undulating residual upland hills dominate the middle part of the area. Steep slopes are developed primarily along the eastern side of Adobe Rim, a prominent escarpment developed in the Adobe Town Member of the Washakie Formation. Badlands are well developed along the north, east and northeastern side of the rim.

Soil Depth. Soils are deep (>40 inches) on alluvial fans, basins, and valley alluvium. Shallow soils (<20 inches) occur on plains and ravines underlain by sandstone, siltstone, and shale bedrock as well as in areas with steeper topography. Moderately deep soils are those considered between 20 and 40 inches; these soils generally lie on residual upland plains and relatively gentle side slopes.

The majority of the soils within the area have moderate permeability. Areas with sandy soil textures, however, have moderately rapid to rapid permeability. Soils with heavier textures have moderately slow to slow permeability. If compacted, soils become less permeable. Soil crusting also reduces infiltration rates. Most soils in the project area are likely to form a surface crust, particularly if vegetative cover deteriorates.

Bedrock underlying the soils is often fractured, which makes it highly permeable. Soils with a high clay content are subject to cracking upon wetting and drying; tubular cavities can develop as water flows through these cracks. Soils adjacent to major drainages tend to be stratified with repeating layers of finer and coarser soil material which allows for differential lateral flow within these layers.

Soil erodibility due to water and wind varies with soil texture. Silts and silt loams are most susceptible to water erosion. In contrast, fine sands, loamy sands, and coarse sandy loams are most susceptible to wind erosion. Water erosion primarily occurs during spring snow melt and summer thunderstorms that cause intensive runoff and flash flooding. Tributary streams of Sand Creek are moderately incised channels. These channels erode as channel banks cave in and through upstream gully migration. Upland erosion simultaneously occurs due to sheet and rill erosion. The sparse vegetative cover exposes more soil to raindrop impact.

Most areas are undergoing moderate natural rates of erosion. The highest rate of natural, geologic erosion from water occurs in areas with naturally low vegetative cover, soil crusting, low organic matter content, and soft shales. In areas high in sodium where clays have dispersed, overall soil particles are more easily detached by wind and water. Areas with greater amounts of vegetative cover and organic matter content and/or lower sodium content have a lower natural rate of erosion by water. In addition, areas with harder rock fragments associated on or near the surface have less erosion from either water or wind. Areas with unstable soils on the surface or at depth are susceptible to slumping, sliding, and soil creep.

3.2.2 Environmental Consequences

3.2.2.1 Proposed Action

The proposed project would involve minimal disturbance since shot holes would be drilled with portable drilling equipment placed on skids. Soil disturbance would be restricted to the effects of drilling of shot holes. Improperly backfilled shot holes or shotholes in which an underground cavity forms as a result of shot discharge could lead to minor surface subsidence in the immediate area of the shot hole.

The total area affected at each shot hole would be no more than an area about 8 feet by 8 feet and is considered negligible to the geologic and soil environment since only the skids of the portable drill will contact the soil. Given the small, discrete areas of disturbance, natural succession of surrounding native species should be sufficient. No important cumulative impacts on soils and geological resources are expected from project implementation.

The Proposed Action would allow Quantum and their client AEC to gather subsurface information without the expense or potentially unnecessary or undue surface disturbance associated with drilling conventional exploratory oil and gas wells. Should seismic operations indicate a potential for commercially viable hydrocarbons being found, exploratory or development wells could occur. The extent of future development is unknown at this point. Any future proposals for individual exploratory wells and/or development wells would be analyzed at that time.

The Proposed Action could impact scientifically significant vertebrate fossils where they are exposed at the surface. Mitigation measures described in 3.2.3 would serve to reduce potential impacts to paleontologic resources. No important cumulative impacts on paleontologic resources are expected from project implementation.

3.2.2.2 No Action Alternative

Under the No Action Alternative, it could be possible that one or more oil and gas wells would be proposed resulting in associated surface disturbing activities. Implementation of the No Action Alternative would forego the opportunity to use 2-D seismograph to gather comprehensive subsurface data on these pre-FLPMA leases and subsequently pinpoint structures that may contain hydrocarbon pools. Without the 2-D data, the lease holder could end up drilling a "dry-hole" resulting in unnecessary and undue surface disturbance. Should any proposals for individual exploratory wells be proposed, they would be analyzed at that time.

3.2.3 Mitigation Summary

Shot holes should be properly backfilled. They should also be inspected for subsidence in one field season and prior to release of the bond liability.

Mitigation measures for paleontology include (a) worker education of the significance of fossil remains and the restriction on collection of paleontologic resources without a permit and (b) provision for accidental discovery of fossil remains should reduce impacts.

The operator is responsible for informing all persons associated with this project that they shall be subject to prosecution for damaging, altering, excavating, or removing any vertebrate fossil objects on site. If vertebrate fossil materials are discovered, the operator is to suspend all operations that further disturb such materials and immediately contact the Authorized Officer. Operations are not to resume until written authorization to proceed is issued by the Authorized Officer.

Within five (5) working days, the Authorized Officer will evaluate the discovery and inform the operator of actions that will be necessary to prevent loss of significant paleontologic resources.

The operator is responsible for the cost of any mitigation required by the Authorized Officer. The Authorized Officer will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the Authorized Officer that the required mitigation has been completed, the operator will be allowed to resume operations.

3.3 WATER RESOURCES

3.3.1 Affected Environment/No Action Alternative

The climate in the project area is semiarid and continental with short, dry summers and long, cold winters. Average annual precipitation probably range between that recorded for Bitter Creek and Baggs, with an average of between 6.72 inches and 11.07 inches, respectively. Thirty-year average records reveal that precipitation is fairly evenly distributed throughout the year with a half inch or less falling on any given day. Peak precipitation months occur during April through June and September through October. Snowfall accumulates on the ground during the winter months but is highly susceptible to redistribution by strong prevailing winds and ablation. Rainfall from cyclonic storms originating in the Pacific Ocean occurs prior to, and after the snowfall season. High intensity, short duration thunderstorms may generate heavy rainfalls from late spring through early fall.

Water resources in the project area include both surface and groundwater and their distribution in the project area are dependent on climate, soils, and structural geology. Surface water is relatively rare or infrequent within the project area which is drained by Sand Creek, a tributary of the Little Snake River. Several unnamed, western tributaries of Sand Creek cross the proposed seismic line. These tributaries, which drain badlands developed east of the Adobe Town Rim are ephemeral (i.e., carry water only in direct response to snow melt and precipitation events). Typically under this regime, streamflow will last for only a short period of time after the runoff-producing event. Flow within the stream channels correlates directly with precipitation; surface runoff occurs during spring and early summer as a result of snowmelt and rainfall. These streams receive little to no support from groundwater discharge to sustain flow; consequently, there are extended periods of time when drainages are dry. A few named and unnamed springs are located at higher elevations near the headwaters of some of the tributaries to Sand Creek, although infiltration and evapotranspiration quickly exceed the discharge rates and intermittent streamflow is sustained only for short distances downstream. Active stream channels in the project area exhibit ephemeral flow only during snowmelt and high-intensity, short-duration summer thunderstorms.

There are no naturally occurring lakes or ponds in the project area and none of the drainages support fisheries. Except for irrigation canals and ditches, as well as ponds constructed away from drainage channels and wetlands, all drainage channels and streams are waters of the U.S. and thus, subject to the requirements of the Federal Clean Water Act (CWA). Activities that involve the discharge pollutants into these waters are regulated by the Environmental Protection Agency (EPA), Army Corps of Engineers (COE), and the Water Quality Division of the Wyoming Department of Environmental Quality (DEQ).

3.3.2 Environmental Consequences

As limited disturbance would occur with project implementation, impacts on surface water resources would be negligible.

Subsurface disturbance is not expected with project implementation except as a result of shot hole drilling to a depth of 80 feet. Interception of groundwater in the Washakie Formation is not anticipated. However, if water is encountered during drilling operations, the appropriate agency (State Engineer's Office) would be notified and any water encountered would be isolated (sealed with a bentonite plug). The proposed project would not contribute to the cumulative impact on water resources of other activities in the project area due to the short-term and minimal disturbance associated with the seismic project.

3.3.3 Mitigation Summary

No additional mitigation is needed.

3.4 VEGETATION/INVASIVE PLANTS

3.4.1 Affected Environment/No Action Alternative

Vegetation in the project area is typical of the semi-arid Wyoming Basin floristic region, where precipitation and soil parent material are controlling factors for plant composition. Vegetation often is sparse. Most of the project area is vegetated with a mix of types typical of the basins of south-central Wyoming and are dominated by plant species that are drought tolerant. Wyoming big sagebrush steppe (grassland with a canopy of *Artemisia tridentata spp. wyomingensis*) and desert shrub vegetation (a shrub type of shadscale [*Atriplex confertifolia*], greasewood [*Sarcobatus vermiculatus*], and Gardner saltbush [*Atriplex gardneri*] form a mosaic that covers most of the area. Sparsely vegetated rock and soil occur as badlands along Adobe Rim. These areas have a sparse cover of mat saltbush (*Atriplex corrugated*), Indian ricegrass, greasewood, stemless goldenweed (*Haplopappus acaulis*), and foliose lichens.

Stream channels in the project area are ephemeral and do not provide sufficient hydrology for wetlands to develop.

Invasive Plants

Surface disturbing activities associated with shot-hole drilling could allow introduction and/or spreading of invasive plant species into the project area. Weeds compete with native species, rendering an area less productive as a source of forage for livestock and wildlife. Weeds can also reduce the effectiveness of vegetal cover in preventing erosion.

There would be 70 shot points along the line affecting approximately 0.10 acre. The potential for introduction of invasive plants on the estimated 0.10 of short term disturbance associated with the Proposed Action is very low. Due to the limited disturbance (no clearing of vegetation, portable drills on skids, small drill holes) no reclamation is proposed.

3.4.2 Environmental Consequences

As indicated previously, negligible or minor vegetation disturbance is expected with project implementation. Drilling shot holes with portable drill rigs could cause some vegetation crushing and soil disturbance; however, that damage is expected to be minimal.

It is unlikely that plant species of special concern would be adversely impacted by the proposed project since portable drills would be located in areas devoid of or with sparse vegetation in the project area and the minimal disturbance that would result. No cumulative impacts to vegetation resources are expected.

3.4.3 Mitigation Summary

Since steep slopes (greater than 25%) would be avoided, no additional mitigation is required.

3.5 WILDLIFE

3.5.1 Affected Environment/No Action Alternative

Two big game species occur in the vicinity of the project area: pronghorn antelope and mule deer. The population estimates for big game herds provided below are based upon Wyoming Game and Fish Department (WGFD) models.

3.5.1.1 Big Game

Pronghorn Antelope. Pronghorn in the project area belong to the Bitter Creek herd which occupies an area of approximately 2,915 mi^2. The entire project area is considered winter/year-long pronghorn range. No crucial pronghorn range occurs within the project area. The nearest crucial pronghorn range is located approximately 6 miles northeast of the project area (WGFD 2001b).

Mule Deer. Mule deer in the project area belong to the Baggs herd (hunt area 100) which occupies approximately 3,440 mi^2. The entire project area is considered winter/year-long mule deer range. The nearest crucial mule deer range is approximately 4 miles north of the project area.

3.5.1.2 Other Mammals.

Predators known to occur or potentially occurring in the project area are coyote, red fox, ermine, long-tailed weasel, badger, striped skunk, mountain lion, and bobcat (Clark and Stromberg 1987; WGFD 1999). Lagomorph species include desert cottontail, mountain (Nuttall's) cottontail, and white-tailed jackrabbit. Circumstantial evidence of Pygmy rabbits has been documented in the vicinity of the project area (WGFD 1999). Squirrels known to occur or to potentially occur include least chipmunk, Richardson's ground squirrel, thirteen-lined ground squirral, and white-tailed prairie dog (Clark and Stromberg 1987; WGFD 1999). Other rodents include Wyoming pocket gopher, Wyoming pocket mouse, Ord's kangaroo rat, white-footed deer mouse, northern grasshopper mouse, and sagebrush vole. Several species of shrews (masked, Merriam's and dwarf) and bats (western small-footed, long-legged myotis, Townsend's big-eared) may also occur.

3.5.1.3 Raptors.

Raptor species known to nest in the vicinity of the project area include short-eared owl, American kestrel, prairie falcon, ferruginous hawk, red-tailed hawk, northern harrier, golden eagle, burrowing owl, and great horned owl (Dorn and Dorn 1990, WGFD 1999). Rough-legged hawk may occur in winter or as migrants. One ferruginous hawk and two golden eagle nests are known to occur within 1.0 mile of the proposed project (Figure 3-1), (BLM 2001a). A survey of the known nests along and near the seismic line were conducted by the BLM on April 24, 2002 (Dunder 2002) although the southern eagle nest was not found during the survey. No raptor activity was found within one mile of the proposed seismic line.

3.5.1.4 Upland Game Birds.

The entire project area is contained within the South Wamsutter upland game bird management

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area, and two upland game bird species--sage grouse and mourning dove--occur in the area (WGFD 1999).

No known leks have been identified on or within 2.0 miles of the project area; however, sage grouse have been observed near the project area in late summer (WGFD 2002). Suitable nesting, brood-rearing, and wintering habitats are present within and in the vicinity of the area in big sagebrush-dominated habitats.

Mourning dove concentrations are usually highest near power lines, buildings, and other areas of human disturbance, and these habitats are uncommon in the project area. Therefore, doves that do populate the project area likely utilize shrub-covered areas along washes and dunes that provide suitable cover for nesting and roosting.

3.5.1.5 Other Birds.

Passerine bird species potentially occurring within the project area, based upon range and habitat preference, include common nighthawk, Say's phoebe, western kingbird, horned lark, swallows (e.g., violet-green, cliff), black-billed magpie, common raven, American crow, rock wren, mountain bluebird, loggerhead shrike, Brewer's sparrow, vesper sparrow, savannah sparrow, sage sparrow, McCown's longspur, western meadowlark, Brewer's blackbird, common grackle, and brown-headed cowbird (WGFD 1999). Several species of wading/shore birds and waterfowl may occasionally occur around seasonal ponds in the vicinity of the project area. These wading/shore birds include American avocet, willets, killdeer, and spotted sandpiper. Waterfowl species likely to occur include mallard, green-winged teal, northern pintail, blue-winged teal, gadwall, and American wigeon (WGFD 1999).

3.5.1.6 Amphibians and Reptiles

Amphibians are not known to occur in the project area. Reptile species include northern sagebrush lizard, eastern short-horned lizard, northern plateau lizard, Great Basin gopher snake, and prairie rattlesnake (WGFD 1999).

3.5.1.7 Fisheries.

The washes within the project area are ephemeral and do not support permanent fish populations (WGFD 1991), therefore fish are not discussed further in this EA.

3.5.1.8 Threatened, Endangered, Proposed, and Candidate Species (TEP&C)/BLM Sensitive Species

The *Endangered Species Act* (16 U.S.C. 1531-1543) protects listed threatened and endangered plant and animal species and their critical habitats. A list of federally listed TEP&C animal and plant species that potentially occur in the vicinity of the proposed project was compiled from several sources, including a letter from the U.S. Fish and Wildlife Service (USFWS), Wyoming State Supervisor Office (USFWS 2001a), and The Wyoming Natural Diversity Database (WNDD) (WNDD 2002a).

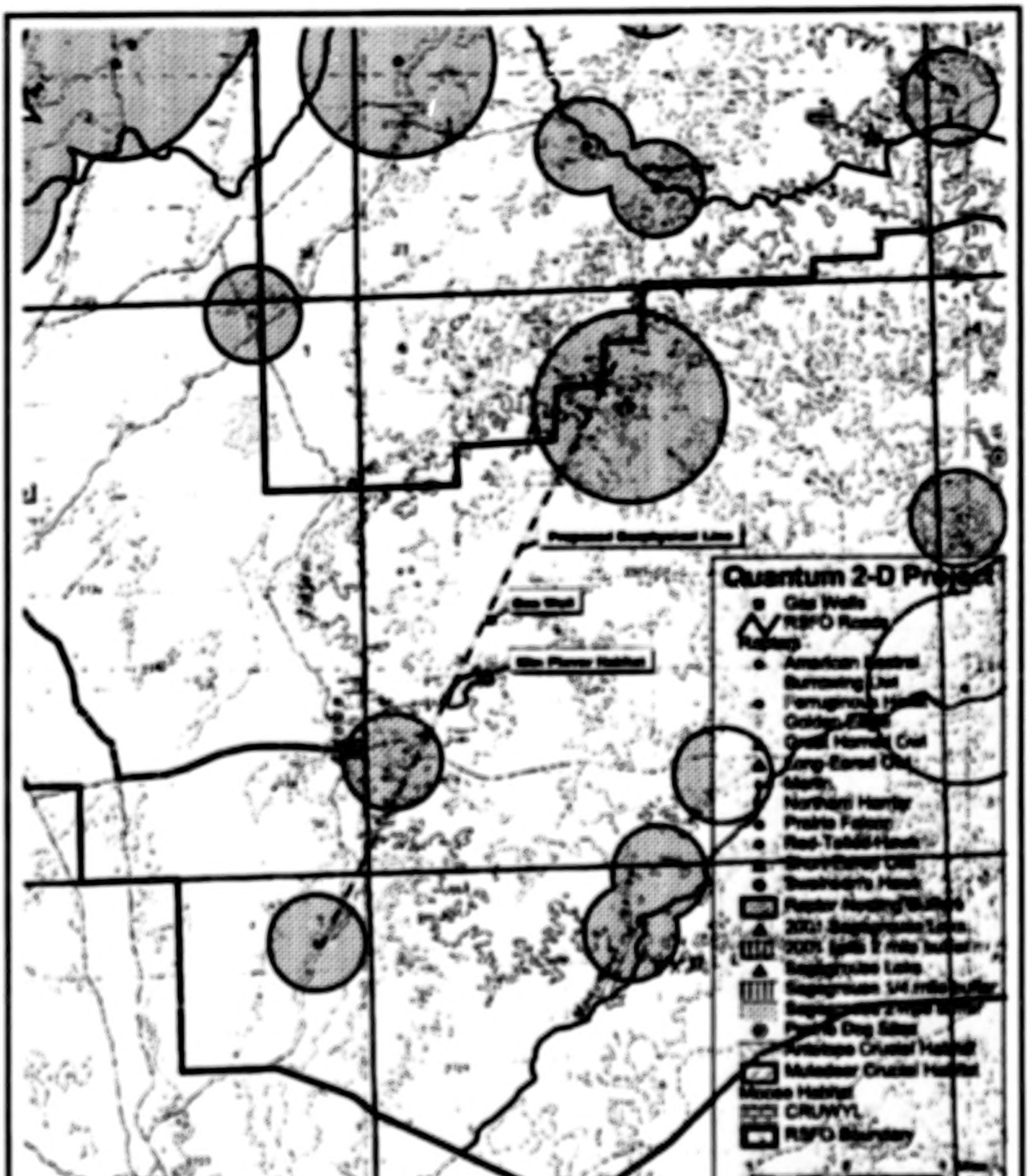

Figure 3-1. Wildlife Map

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TEP&C species are those that have been specifically designated as such by the USFWS. Endangered species are those that are in danger of extinction throughout all or a significant portion of their range. Threatened species are those that are likely to become endangered in the foreseeable future throughout all or a significant portion of their range. Proposed species (proposed for listing as threatened or endangered) are those for which the USFWS has issued proposed rules, but for which a final listing decision has not been made. Candidate species are those for which the USFWS has sufficient data to list as threatened or endangered, but for which proposed rules have not yet been issued. BLM sensitive species are those that may warrant further protection and as such are specifically managed by the BLM.

Threatened and endangered animal species that could occur in the vicinity of the project area include black-footed ferret (*Mustela nigripes*), bald eagle (*Haliaeetus leucocephalus*), and whooping crane (*Grus americana*) (Table 3-3). Mountain plover (*Charadrius montanus*), a species proposed as threatened, also may occur within the project area. The yellow-billed cuckoo is a candidate for listing. The threatened Ute ladies'-tresses (*Spiranthes diluvialis*) is the only federal-listed plant species with the potential to occur within the project area (USFWS 2001).

Table 3-3. Federal Threatened, Endangered, Proposed, and Candidate Species and Their Potential Occurrence on the Quantum Geophysical Adobe Town 2-D Seismic Project Area, Sweetwater County, Wyoming, 2002.[1]

Species		Federal Status[2]	Potential Occurrence on Project Area[3]
Common Name	Scientific Name		
MAMMALS			
Black-footed ferret	*Mustela nigripes*	E	X
BIRDS			
Bald eagle[4]	*Haliaeetus leucocephalus*	T	R
Mountain plover	*Charadrius montanus*	P	U
Whooping crane	*Grus americana*	E	X
Yellow-billed cuckoo	*Coccyzus americanus*	C	X
FISH			
Bonytail chub	*Gila elegans*	E	X
Colorado pikeminnow	*Ptychocheilus lucius*	E	X
Humpback chub	*Gila cypha*	E	X
Razorback sucker	*Xyrauchen texanus*	E	X
PLANTS			
Ute ladies'-tresses	*Spiranthes diluvialis*	T	X

[1] Adapted from U.S. Fish and Wildlife Service (USFWS) (2001).

[2] Federal status (USFWS 2001):
E = Federally listed as endangered.

T = Federally listed as threatened.
P = Proposed for federal listing as threatened (64 *Federal Register*, 7587-7601 February 16, 1999).
C = Candidate species for listing.

[3] Species occurrence:
U = Uncommon; species may be present in the project area, but in such low numbers or in such small and widely scattered populations that an encounter during field development and operation is unlikely. The species could be present for a significant part of the year (e.g., breeding season, summer resident).
R = Rare; species may be in the project area for just a few days or hours (e.g., stopping over during migration), or the species has only occasionally or rarely been sighted in the project area. Encounters during field development and operation are very unlikely.
X = Unlikely; there has been no recent historical record of the species' occurrence in the project area; probability of encountering the species during field development and operation is very unlikely.

[4] Proposed for removal from federal listing.

Four endangered Colorado River fishes--the bonytail chub, Colorado pikeminnow, humpback chub, and razorback sucker --are residents of the Green and Colorado River systems below Flaming Gorge Dam (USFWS 1987; Tyus and Karp 1989; Matthews 1990). Under the *Recovery and Implementation Program for Endangered Fish Species in the Upper Colorado River Basin* (RIP), any water depletions from tributary waters within the Colorado River drainage are considered as jeopardizing the continued existence of these fish. Little water would be required for the proposed project, therefore, no depletion would occur as a result of the Proposed Action. Thus, Colorado River endangered fish species are not discussed further in this EA.

3.5.1.8.1 Threatened Endangered, Proposed & Candidate Species

Black-footed Ferret. The black-footed ferret, a federally endangered species, was once distributed throughout the high plains of the Rocky Mountain and western Great Plains regions (Forrest, et al. 1985). Prairie dogs are the main food of black-footed ferrets (Sheets, et al. 1972), and few black-footed ferrets have been historically collected away from prairie dog towns (Forrest, et al. 1985). The *Black-footed Ferret Survey Guidelines for Compliance with the Endangered Species Act* (USFWS 1989) defines potential black-footed ferret habitat as any white-tailed prairie dog towns or complexes greater than 200 acres in size with a burrow density of greater than 20 burrows per hectare (8 burrows per acre). No prairie dog towns were found in the area during surveys conducted in December 2001; therefore, no potential black-footed ferret habitat is present along the proposed seismic line (TRC Mariah 2002). The black-footed ferret is not discussed further in this EA.

Bald Eagle. The bald eagle is a federally threatened species (down listed from endangered and now proposed for removal from federal listing) which requires cliffs, large trees, or sheltered canyons associated with concentrated food sources (e.g., fisheries or waterfowl concentration areas) for nesting and/or roosting areas (Edwards 1969; Snow 1973; Call 1978; Steenhof 1978; Peterson 1986). Bald eagles forage over wide areas during the non-nesting season (i.e., fall and winter) and scavenge on animal carcasses such as pronghorn, deer, and elk.

No bald eagle nests or winter roosts are known to occur in the project area--the lack of suitable nesting or winter roosting habitats within the project area precludes its use for such activities by bald eagles. Flaming Gorge Reservoir and the Green River, located over 60 miles west of the project area, provides favorable nesting, roosting, and foraging habitat for bald eagles. Searches of the

WNDD revealed no records of bald eagles in the vicinity of the project area (WNDD 2002a); therefore, it is unlikely that individuals would be adversely affected by the proposed project, and bald eagle is not discussed further in this EA.

Mountain Plover. The mountain plover is proposed for federal listing as threatened. It inhabits the high, dry short-grass plains east of the Rocky Mountains (Dinsmore 1983), as well as sagebrush grasslands throughout Wyoming (WGFD 1999), and is found in northern Utah and northwestern Colorado (Knopf 1996). Mountain plovers are documented as breeding throughout Wyoming (WGFD 1999). Parrish, et al. (1993) noted that mountain plover nests were found in areas with at least 30% bare ground; vegetation is short (<4 inches) in spaced clumps or mats (e.g., cushion plants) and terrain was relatively flat. Mountain plover breeding/nesting habitat is often associated with active prairie dog towns (USFWS 2001b). In Colorado, the mountain plover diet is composed of 99.7% arthropods, with beetles, grasshoppers, crickets, and ants the most important food items (Baldwin 1971). Breeding bird surveys between 1966 and 1987 show an overall decline in the continental population of mountain plover (U.S. Department of Agriculture, Forest Service [USFS] 1994a, 1994b). Probably the most important reason for the decline of the mountain plover are impacts and habitat alteration on breeding grounds and degradation in the quality of wintering habitats (e.g., southern Texas, California) (Knopf 1994, 1996). Loss of breeding habitat due to cultivation and prey base declines resulting from pesticide use are also threats to mountain plover survival (Wiens and Dyer 1975). Cattle often maintain the open grass habitat favored by mountain plover, so livestock grazing may benefit the species (Klipple and Costello 1960).

A portion of seismic line is composed of saltbush flats that are relatively void of vegetation (TRC Mariah 2002). This vegetation community could provide suitable nesting and foraging habitat for mountain plover. A mountain plover breeding site has been recorded in the vicinity of the project area in 1997 (WNDD 2002a). Mountain plover observations have also been recorded within the Continental Divide Oil and Gas Field located approximately 8 miles north of the project area (BLM 1999). A mountain plover habitat survey was conducted by the BLM on April 29, 2002 (Dunder 2002). No mountain plover were observed during the habitat survey although a small segment of the proposed line skirts the edge of mountain plover habitat (Figure 3-1).

Whooping Crane. A federally endangered species, the whooping crane inhabits moist to wet meadow grasslands, irrigated native and introduced meadows, sedge meadows, and marshes, where it feeds on a variety of plants and animals (WGFD 1999). All WGFD recorded observations of whooping cranes in Wyoming have occurred in the western part of the state, and these birds are probably part of the Gray's Lake fostering project (WGFD 1999). Dorn and Dorn (1990) also report several observations of whooping cranes in eastern Wyoming. Whooping cranes use the Green River as a spring and fall migration corridor; however, no suitable habitat occurs in the project area. No historic or recent observations of whooping cranes are known from the vicinity of the project area (WNDD 2002a), and the likelihood of their presence in the area is extremely low; therefore, the whooping crane is not discussed further in this EA.

Yellow-billed cuckoo. In Wyoming, the yellow-billed cuckoo is a rare summer breeder that arrives from wintering grounds in South America in late May, and departs from September to October. The yellow-billed cuckoo is primarily found in open, streamside deciduous woodland with low, scrubby vegetation undergrowth bordering Wyoming's larger rivers. Cottonwood stands and willow thickets are preferred for nesting and foraging (WNDD 2002b). The yellow-billed cuckoo has been identified as potentially occurring in the riparian areas west of the Continental Divide (USFWS 2001a); however, it is highly unlikely that the yellow-billed cuckoo occurs in the project area, since no riparian habitat is present and no observations have been recorded in the vicinity (WNDD 2002a). The

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nearest potential yellow-billed cuckoo habitat is likely located along the Green River located over 60 miles west of the project area. Therefore, the yellow-billed cuckoo is not discussed further in this EA.

Ute Ladies'-Tresses. Ute ladies'-tresses, a federally threatened species, is a perennial member of the orchid family which inhabits moist streambanks, wet meadows, and abandoned stream channels at elevations of 4,500-6,800 feet (Fertig 1994; Spackman, et al. 1997). Where it occurs in ephemeral drainages, ground water is typically shallow (i.e., within approximately 18 inches of the ground surface) (personal communication, March 16, 2000, with Pat Deibert, USFWS; personal communication, March 22, 2000, with Walt Fertig, WNDD). No suitable Ute Ladies'-tresses habitat occurs within the project area, and the likelihood of their presence in the area is extremely low. Therefore, Ute ladies'-tresses are not discussed further in this EA.

3.5.1.8.2 BLM-Sensitive Species

Based on habitat preference and geographic location, numerous BLM-sensitive species occur or potentially occur in the project area (BLM 2001b)(Table 3-4). The burrowing owl, Payson's tansymustard, and many-headed broom groundsel have been recorded in the vicinity of the project area (WNDD 2002a).

Table 3-4. BLM Sensitive Species Potentially Occurring in the Vicinity of the Quantum Geophysical Adobe Town 2-D Seismic Project Area, Sweetwater County, Wyoming, 2002.[1]

Species Common Name	Scientific Name	Habitat
MAMMALS		
Dwarf Shrew	*Sorex nanus*	Mountain foothill shrub, grasslands
Spotted Bat	*Euderma maculatum*	Cliffs over perennial water, basin-prairie shrub
Townsend's Big-eared Bat	*Corynorhinus townsendii*	Forests, basin-prairie shrub, caves and mines
Pygmy Rabbit	*Brachylagus idahoensis*	Basin-prairie and riparian shrub
White-tailed Prairie Dog	*Cynomys leucurus*	Basin-prairie shrub, grasslands
Wyoming Pocket Gopher	*Thomomys clusius*	Meadows with loose soil
Idaho Pocket Gopher	*Thomomys idahoensis*	Shallow stony soils
Swift Fox	*Vulpes velox*	Grasslands
BIRDS		
Ferruginous Hawk	*Buteo regalis*	Basin-prairie shrub, grassland, rock outcrops
Peregrine Falcon	*Falco peregrinus*	Tall cliffs
Greater Sage-grouse	*Centrocercus urophasianus*	Basin-prairie shrub, mountain-foothill shrub
Burrowing Owl	*Athene cunicularia*	Grasslands, basin-prairie shrub

Species Common Name	Scientific Name	Habitat
Sage Thrasher	*Oreoscoptes montanus*	Basin-prairie shrub, mountain-foothill shrub
Loggerhead Shrike	*Lanius ludovicianus*	Basin-prairie shrub, mountain-foothill shrub
Brewer's Sparrow	*Spizella breweri*	Basin-prairie shrub
Sage Sparrow	*Amphispiza billineata*	Basin-prairie shrub, mountain-foothill shrub
Baird's Sparrow	*Ammodramus bairdii*	Grasslands, weedy fields
REPTILES		
Midget Faded Rattlesnake[2]	*Crotalus viridis concolor*	Mountain foothills shrub, rock outcrop
PLANTS		
Mystery Wormwood	*Artemisia biennis var. diffusa*	Clay flats & playas 6,500'
Nelson's Milkvetch	*Astragalus nelsonianus -or- Astragalus pectinatus var. platyphyllus*	Alkaline clay flats, shale bluffs and gullies, pebbly slopes, and volcanic cinders in sparsely vegetated sagebrush, juniper, & cushion plant communities at 5200-7600'
Precocious Milkvetch	*Astragalus proimanthus*	Cushion plant communities on rocky, clay soils mixed with shale on summits & slopes of white shale hills 6,800-7,200'
Cedar Rim Thistle	*Cirsium aridum*	Barren, chalky hills, gravelly slopes, & fine textured, sandy-shaley draws 6,700-7,200'
Ownbey's Thistle	*Cirsium ownbeyi*	Sparsely vegetated shaley slopes in sage & juniper communities 6,440-8,400'
Large-fruited Bladderpod	*Lesquerella macrocarpa*	Gypsum-clay hills & benches, clay flats, & barren hills 7,200-7,700'
Stemless Beardtongue	*Penstemon acaulis var. acaulis*	Cushion plant or Black sage grassland communities on semi-barren rocky ridges, knolls, & slopes at 5,900-8,200'
Beaver Rim Phlox	*Phlox pungens*	Sparsely vegetated slopes on sandstone, siltstone, or limestone substrates 6,000-7,400'
Tufted Twinpod	*Physaria condensata*	Sparsely vegetated shale slopes & ridges 6,500-7,000'
Green River Greenthread	*Thelesperma caespitosum*	White shale slopes & ridges of Green River Formation 6,300'

[1] Adapted from BLM 2001b.

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[2] Crotalus viridus concolor has not been documented to occur in the project area. Range of this species is not known to overlap with the prairie rattlesnake, Crotalus viridus viridus which is found throughout the Washakie Basin.

3.5.2 Environmental Consequences

Impacts to wildlife could result from displacement of wildlife due to disturbance by project-related activities (helicopters, drilling, traffic, etc.) and an increased potential for vehicle/animal collisions due to increased traffic during seismic operations. No shot holes would be allowed on areas having burrows so no impact to burrows is expected (discharging the explosives do not cause collapse of burrows).

3.5.2.1 Big Game

Under the Proposed Action, vegetation could be disturbed on approximately 0.10 acre of pronghorn and mule deer winter/year-long range due to the drilling of 70 shot points. The 70, 3.5-inch drill holes would be scattered along a 5.90-mile line (on lease only) in small 8-foot by 8-foot parcels. All other projected-related disturbances such as helicopter landing areas, and staging areas for the deployment of equipment would occur on private property or existing roads.

Applicant-committed practices to minimize impacts to big game from loss of vegetative cover include minimization of vegetation disturbance to the extent possible by locating drilling equipment on areas devoid of or with sparse vegetation, vehicular use of existing roads, the use of helicopters to deploy seismic lines, and the use of foot travel for all project-related activities within the Adobe Town WSA. Therefore impacts to big game habitat are not expected to be significant.

Disturbance from helicopters, trucks, project-related activities (i.e., seismic testing), and human presence could affect utilization of habitats immediately adjacent to these areas. Some short-term pronghorn displacement may occur. Impacts to mule deer would be similar to those of pronghorn. The highest levels of displacement would likely occur during the delivery of the seismic lines by helicopters and the drilling of the shot holes when human activity occurs at its highest levels. Based on studies (Gusey 1986; Guenzel 1986, and Easterly, et al. 1991), any displacement likely would be about 0.5 miles; however, since the project is expected to take no more than 7 days where no crucial big game range occurs in the immediate vicinity, disturbance to big game by displacement is not significant.

Increased mortality from vehicle/animal collisions is a potential but an unlikely impact that could occur. However, vehicular travel within the Adobe Town WSA would occur only along existing roads and for only a short period of time; therefore, increased mortality from vehicle/animal collisions as a result of the proposed project is not anticipated to be significant.

3.5.2.2 Other Mammals

Direct impacts to other mammals would include disruption during project activities and possible vehicle/animal collisions. Most small mammal species are relatively tolerant of human activity (they abandon the area). Total project-required disturbance would be 0.10 acre and this disturbance would be short term. Any disturbance would occur in small areas over a dispersed area; therefore, impacts to mammal habitat (through displacement) are not anticipated to be significant. Project impacts to small mammals would likely be masked by natural variations in populations due to weather, disease, and other natural factors. Vehicular travel would be limited to existing roads and occur over a short period; therefore, any potential mortality from vehicle/animal collisions is not anticipated to be significant.

3.5.2.3 Raptors

Factors potentially resulting in decreased raptor reproductive success from the presence of increased human activities in the area include nest and/or area abandonment, damage to eggs or young from frightened adults, overexposure of eggs or young to heat or cold, missed feedings, premature fledging, and increased predation. The potential for these impacts would be greatest if project-related activities (heliport, project-set up, increased human presence) would occur during the raptor nesting and/or rearing season and in the vicinity of occupied raptor nests. Raptor surveys of the project area and 1.0-mile buffer have been completed prior to operations. No raptor activity was observed and raptor clearance has been recommended by the BLM.

Reduction in raptor prey species would be minimized by holding disturbance to minimum levels. Project-related activities would affect approximately 0.10 acre and occur over a short period of time; therefore, no reduction in prey species is expected and is not anticipated to significantly impact raptors.

3.5.2.4 Game Birds

No sage grouse leks are known to occur within 2.0 miles of the project area; therefore project activities are not anticipated to impact breeding and/or nesting sage grouse.

Mourning doves would not be significantly impacted by the proposed project because of the project timing, the low level of habitat disturbance, the inherent mobility of the species, and the availability of suitable habitats on nearby undisturbed lands.

3.5.2.5 Other Birds

Nongame birds could be adversely affected by increased human activity in the project area; however, impacts would occur primarily in direct proportion to the amount of a species' habitat that would be affected. Since surface disturbance would be scattered in small parcels (0.10 acre total) along a 5.90 mile linear distance (on lease only) and these disturbances would be short term, impacts are anticipated to be less than significant.

3.5.2.6 Amphibians and Reptiles

Direct impacts to reptiles likely would occur in direct proportion to the amount of their habitat disturbed. Since disturbance would be scattered in small parcels (0.10 acres total) along the 5.90 mi-linear distance, and all disturbance would be short-term, no significant impacts are anticipated.

3.5.2.7 Threatened, Endangered, Proposed, and Candidate Species

The temporary loss of potential mountain plover breeding and foraging habitat due to proposed project activities is unlikely to adversely affect breeding plover or jeopardize individuals. A mountain plover habitat survey has been completed by the BLM. No mountain plover were observed during the survey conducted on April 29, 2002. A mountain plover clearance would be conducted in accordance with U.S. Fish and Wildlife survey guidelines (March 2002) as proposed.

3.5.3 Mitigation Summary

In order to minimize impacts to big game winter/yearlong range, patches of tall sagebrush should be avoided by seismic operations where practical.

3.6 NOISE

3.6.1 Affected Environment/ No Action Alternative

The major sources of noise within the project area are occasional jet aircraft traffic overflights at high altitudes and localized vehicular and light industry activity on local resource roads within the project area. These noise sources currently create only modest sound disturbances within the area.

3.6.2 Environmental Consequences

Seismic-related activities, including portable drill rigs and support vehicles, helicopters and helicopter support traffic, and actual shot hole drilling and shooting operations would create sound disturbance within the project area. These impacts would be short-lived and at a time when few people are using the area, lasting only as long as the project is ongoing (7 days). No long-term noise related impacts would result from the seismic operations.

3.6.3 Mitigation Summary

Given the type of seismic operation and the remote location of seismic operations, no additional measures are needed to mitigate project-generated noise.

3.7 WILDERNESS/VISUAL RESOURCES/RECREATION

3.7.1 Affected Environment

The Adobe Town WSA is located approximately 25 miles south of Wamsutter and contains 82,350 acres of public land managed by BLM, 3,360 acres of split estate land (BLM surface), and 1,280 acres of State of Wyoming land. The WSA is bounded on the north by checkerboard lands and the Manual Gap Road, on the west by the Adobe Town Rim road, the south by the Shell Creek road, and on the east by the Willow Creek road. These roads are lightly traveled; most motorists are local ranchers, oil/natural gas field personnel, or a limited number of hunters that use these roads during the upland bird and big game seasons. Due to the remote location, visitor use is likely to be fairly low. One oil/gas well is located in Section 2, T. 15 N., R. 96 W. (outside of the project area), and has been plugged. Two other wells, one located in Section 20, T. 15 N., R. 97 W., and one located in Section 30, T. 15 N., R. 97 W., are within the three pre-FLPMA leases affected by the seismic project but have been plugged and abandoned.

The BLM has evaluated the visual resources of the project area using the BLM Visual Resource Management (VRM) System. According to the Green River RMP, lands within the Adobe Town WSA were classified as Class II. Washington Office Instruction Memorandum (WO-IM-2000-096) directs BLM to manage viewsheds within WSAs as Class I. VRM management objective for Class I areas, with the exception of grandfathered rights, is to preserve the existing character of the landscape. This class provides for the natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

The project area is not visible from any major viewing points such as highways, cities, or recreation areas.

There are no developed recreation facilities within the project area. Known levels of recreation activity within the project area and adjacent lands are low and occur predominantly during the fall hunting seasons. The project area is within Antelope Hunting Area 57, and Mule Deer Hunting Area 100. The 2001 mule deer hunting season ran from September 15 through September 30. The 2001 antelope season ran from October 15 through October 31.

3.7.2.1 Environmental Consequences of the Proposed Action

Short-term impacts to visual resources would occur where seismic equipment is visually evident to casual observers.

Past disturbance to the visual resources in the immediate area have been low in scale. Roads, drill sites, and other activities have introduced a human-natural mix into the characteristic landscape. Consequently, the impact of the proposed 2D seismic program on the visual resource would not be substantial in the short term. There would be no long-term impacts to the visual resource following completion of seismic operations and removal of equipment. Some minor trampling of vegetation could result.

Short-term impacts to the recreation resource would occur where seismic related activities disrupt the quality of dispersed recreation activities should such activities take place when seismic operations are occurring. Due to the timing of this operation, it is unlikely that recreationists would be impacted. No long-term impacts to recreation would occur following completion of the seismic project.

Should seismic operations indicate a potential for commercially viable hydrocarbons, future exploratory or development wells could be proposed on these leases within the Adobe Town WSA. The extent of future development is unknown at this point. Any future proposals for individual exploratory wells and/or development wells would be analyzed at the time.

3.7.2.2 Environmental Consequences of the No Action Alternative

Implementation of the No Action Alternative would forego the opportunity to use 2-D seismograph to gather comprehensive subsurface data on the three pre-FLPMA leases resulting in possible unnecessary and undue surface disturbance within the Adobe Town WSA should one or more "dry-holes" be drilled. Any proposals for individual exploratory wells would be analyzed at the time.

3.7.3 Mitigation Summary

No additional mitigation is proposed.

3.8 SOCIOECONOMIC CONSIDERATIONS

3.8.1 Affected Environment/No Action Alternative

The Adobe Town Rim Prospect 2-D seismic project is located in the northwest portion of the Washakie Basin southeast of Rock Springs, Wyoming, in the south-central portion of Sweetwater County. This region of Wyoming is located in the south-central portion of the Wyoming Basin physiographic province as defined by Fenneman (1931). Specifically, it is about 31 miles (50 km) south of Bitter Creek, Wyoming.

The economic base within Sweetwater County is primarily dependent on oil and gas and mining.

Peak workforce at any one time for the project is expected to be approximately 15 workers. Total time to complete the project is estimated at 7 days. Quantum would be conducting the seismic operations on the Adobe Town 2D seismic project. Seismic crews would be headquartered in Rock Springs, Wyoming, due to availability of short-term housing and other basic services. Crews would be transported to the project area and back to Rock Springs on a daily basis. Crews would not be kept on-site at the project area.

3.8.2 Environmental Consequences

The range of possible impacts is broad, including short-term increases in economic activity for those businesses capable of providing support goods and services (motels, restaurants, stores, etc.), primarily in the Rock Springs area. For the most part, however, it appears unlikely that the project as currently proposed would alter area social or economic conditions from their current status. Also, it is unlikely that the project would cause disruption of ranching operations and the lifestyles of ranch operators and their families who work in the immediate vicinity of the seismic project. This is primarily due to the short duration of the project (7 days) and the relatively small work force anticipated (approximately 15 people).

Quantum maintains full-time experienced crews. As a result, employment opportunities for the local population is not likely. The number of workers likely to migrate into the area to work on the project is sufficiently small so as to preclude any significant economic or social disruptions of the types that have occurred in communities affected by energy-related boom growth. Rock Springs and other area communities have sufficient infrastructure to accommodate substantially more growth than is likely to be stimulated by this project.

It is very unlikely that proposed project activities would generate significant levels of concern, opposition, or dissatisfaction among the general population of area communities. Residents of area communities are accustomed to and generally accepting of oil and gas related activities, including seismic operations, and are unlikely to view this project as problematic, particularly since it is located adjacent to areas where previous oil and gas related activities have occurred.

In addition, project-related expenditures and income associated with project employment would also generate monetary inflows to the area economy.

3.8.3 Mitigation Summary

No additional mitigation is required.

3.9 CULTURAL/HISTORICAL RESOURCES

3.9.1 Affected Environment/No Action Alternative

Class I file searches were conducted on October 2 (Nos. 4748 and 4749) and November 15 (No. 5244), 2001, through the Cultural Records Office of the Wyoming State Historic Preservation Office (SHPO) for Sections 4, 8, 9, 17, 19, 20, 30, and 31, T15N, R97W; Section 36, T15N, R98W; and Section 1, T14N, R98W. The file searches indicate that 13 projects have been conducted within the sections crossed by the Adobe Town Rim Prospect 2-D seismic project. Of these, five were linear surveys completed for access roads, four were block surveys for well pads, two were linear surveys for pipelines, one was a linear survey for a seismic line, and one was a linear sampling survey for a miscellaneous project.

A total of 30 sites were identified by the 13 previous projects conducted in the sections crossed by the current project. These sites include eight NRHP-eligible sites, five NRHP-ineligible sites, and 17 sites that are unevaluated with respect to the NRHP. All 30 sites are prehistoric and comprise 17 open camps, nine lithic scatters, two lithic scatters with groundstone, one lithic scatter with ceramics, and one lithic scatter with a cairn. None of the previously recorded sites occur within the inventoried project area. However, one site does occur along the receiver line, but because it is located outside of a source point location, it will not be impacted by the project.

A Class III inventory indicated that four historic properties are within or near the path of the receiver points. Shot points locations were altered to avoid the three sites along the seismic line.

3.9.2 Environmental Consequences

Conducting the proposed seismic program could cause impacts to sites determined to be eligible for nomination to the National Register of Historic Places (NRHP). However, given the modification of locating shot points to avoid the three sites along the line, no direct impacts to cultural resources are expected. Indirect or cumulative impacts are not expected since no vehicles would be allowed off existing roads and collecting of artifacts is prohibited.

3.9.3 Mitigation Summary

Impacts to cultural/historical resources within the project area would be alleviated by avoidance of the site. No additional mitigation is identified.

3.10 Adobe Town Wild Horse Herd Management Area

The proposed action would occur in the Adobe Town Wild Horse Herd Management Area. Gathering of excess wild horses is scheduled for mid-July 2002. Since seismic operations affect only a small portion of the herd management area and the fact that wild horses are very tolerant of human activity (there could be short duration displacement if they are in the vicinity of the operations), wild horses are not expected to be affected or impacted by seismic activity. Wild horses will not be discussed further.

3.11 SUMMARY OF CUMULATIVE EFFECTS

Cumulative effects may occur due to the Proposed Action in combination with other ongoing activities, recently constructed projects, and projects likely to be implemented in the near future. Cumulative effects are both additive and interactive. Chapter 3 discusses these effects under each resource discipline section (Environmental Consequences).

The following is a summary discussion of cumulative effects likely to occur with implementation of the Adobe Town 2D seismic project in combination with other ongoing activities within or adjacent to the seismic project area.

There is one proposed activity in the immediate vicinity of the Adobe Town 2D seismic project, which is the Skull-Creek 2D seismic project. This project has not yet been approved by the BLM. Grazing can occur year-round but is dependent on the availability of water. No other activities are known to occur.

No cumulative impacts are expected to result from project-related activities for the following reasons:

- Project impacts as described in this EA for the Proposed Action are temporary in nature, involving minimal site disturbance;
- No cumulative impacts to big game are anticipated from the proposed project because no crucial big game range would be disturbed and all impacts would be of short duration (7 days). In addition, no cumulative impacts to other mammals, birds, reptiles, and amphibians are anticipated from the proposed project because a relatively small area (0.10 acre) would be disturbed and all of the disturbance would be short term. While the total extent of sage grouse habitat along the proposed seismic route has not been defined, only limited and scattered habitat disturbance (i.e., 0.10 acre along a 5.90-mile linear distance located on lease) would occur, a pre-disturbance survey for wintering grouse would be implemented, and appropriate BLM-identified mitigation/avoidance measures would be applied if wintering grouse are found; therefore, no notable cumulative impacts to sage grouse are anticipated. No cumulative impacts to raptor species are anticipated as a result of the proposed project since the project would occur outside the actual raptor nesting season for the species potentially affected and appropriate surveys and avoidance/impact minimization measures would be applied in the event nesting raptors are found in the area.

Therefore, the proposed Adobe Town 2D seismic project as described in this EA (the Proposed Action) together with other federal actions and local commercial and recreational activities would not appreciably affect critical elements of the human environment.

CHAPTER 4

CONSULTATION AND COORDINATION

4.0 BACKGROUND

An environmental assessment (EA) must be prepared when a federal government agency considers approving an action within its jurisdiction that may impact the human environment. An EA aids federal officials in making decisions by presenting information on the physical, biological, and social environment of a proposed project and its alternatives. The first step in preparing an EA is to determine the scope of the project, the range of action alternatives, and the impacts to be included in the document.

The Council on Environmental Quality (CEQ) regulations (40 CFR, Parts 1500-1508) require an early scoping process to determine the issues related to the proposed action and alternatives that the EA should address. The purpose of the scoping process is to identify important issues, concerns, and potential impacts that require analysis in the EA and to eliminate insignificant issues and alternatives from detailed analysis.

The Adobe Town 2D seismic environmental analysis was prepared by a third party contractor, working under the direction of, and in cooperation with the Bureau of Land Management, Rock Springs Field Office, the lead agency for the project.

4.1 PUBLIC PARTICIPATION, CONSULTATION, AND COORDINATION

Public participation, consultation, and coordination has occurred. BLM issued a scoping document on December 6, 2001, informing the public of the Proposed Action to conduct geophysical operations on pre-FLPMA leases within the Adobe Town WSA. Nine response letters were received during the scoping process. Eight of the nine respondents supported the project and/or identified specific resource concerns that should be considered in the EA. The one letter in opposition to the project stated oil and gas exploration (including seismic) and development is inappropriate in a WSA. Additionally, the letter raised concerns about possible impacts to the wilderness character of the Adobe Town WSA; impacts to wildlife and their habitats, vegetation, archaeological and paleontological resources, possible impacts resulting from chemical spills; effects of underground blasts on subsurface hydrology, including aquifers that may feed local springs and seeps; effects on unstable and erodible slopes, and outcrops within the WSA; and direct, indirect, and cumulative impacts of the project on the resources listed above. Issues brought forth in this letter have been addressed to the extent that these concerns or species are or may be present in the project area. Some of the species identified, such as the pallid bat and hoary bat, are not present. Thus, these species were not addressed.

During preparation of the EA, the BLM and the consultant interdisciplinary team (IDT) have communicated with, and received or solicited input from various federal, State, county, and local agencies, elected representatives, environmental and citizens groups, industries, and individuals potentially concerned with issues regarding the proposed geophysical action.

4.2 LIST OF PREPARERS

The following table 4-1 identifies the core consultant interdisciplinary team and BLM interdisciplinary team that were principally involved with preparing this EA.

Table 4-1 List of Preparers

Task	Individual
Project Manager - IDT Leader, Quality Assurance/Quality Control	Gary Holsan, Gary Holsan Environmental Planning
Soils, Geology, Paleontology, Water Resources, Vegetation	Gustav Winterfeld - Erathem-Vanir Geological
Wildlife, TEP&C, BLM-Sensitive Species	Peter Guernsey, TRC Mariah Associates Inc. Laramie, Wyoming Jan Hart, TRC Mariah Associates Inc. Laramie, Wyoming
BLM Project Manager	Teri Deakins, RSFO
Assistant Field Manager Lands and Minerals	Ted Murphy, RSFO
Assistant Field Manager Resources	Bernie Weynand, RSFO
Document Editing	Angelina Pryich, RSFO
Wild Horses	Kevin Lloyd, RSFO
Wildlife, TEP&C, BLM-Sensitive Species	Jim Dunder, RSFO
Cultural Resource	Terry Del Bene, RSFO
Natural Resource Specialist	John MacDonald, RSFO
Hydrologist	Dennis Doncaster, RSFO
Vegetation/Sensitive Plants	Jim Glennon, RSFO
Wilderness/Recreation	Andy Tenney, RSFO
Geology/Paleontology	David Valenzuela, RSFO
Physical Scientist	Vickie Mistarka, WSO

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Appendix A
Criteria to Consider for Exceptions to Seasonal Restrictions for Raptors/Sage Grouse

REQUESTER: ______________________ DATE OF REQUEST: ____________

PROJECT NAME: ____

REQUESTED DATE(S) OF EXCEPTION: ____ ________________________

ACTIVITY PROPOSED: ________ ___________________________________

LAST DATE OF FIELD EXAM: ________________
GIS/ARCVIEW MAP REVIEWED: YES NO

General Considerations - Requests for Exceptions	**Comments**
Are factors leading to inclusion of the sage grouse/raptor seasonal restriction still valid?	
What action is the request for an exception for?	
Dates of the proposed exception?	

Criteria for Lek or Nesting Habitat/Location/Topography		**Comments**
Birds and type	present or absent	
Wintering Areas	yes, no	
Nest or lek location		
Topographical features		
Nest or Lek Active	yes, no, unknown	
Nest chronology of species		
Timing		**Comments**
Early or late in breeding/nesting season		
Kind of and length of disruptive activity		

RECOMMENDED ACTION: Based on the above analysis I recommend the exception be:

Approved: ___________ Denied: ________________

______________________________ Date: ________________
Wildlife Biologist

The exception is: Approved: ___________ Denied: ________________

______________________________ Date: ________________
Authorized Officer

END

02-19-04